

COMPUTING FOR BUSINESS AND HOME

INTERFACE TM

APRIL 1982

\$2.50/CANADA/MEXICO \$3.00

7/4

COMPARING ACCOUNTING PACKAGES:

How Do
They Add Up?

The
Retail Market
Goes Computer

Where to Buy
Software

X 0750653 8212 FAXN
MIDWESTERN ST UNIV
MOFFETT LIBRARY
3400 TAFT
WICHITA FALLS

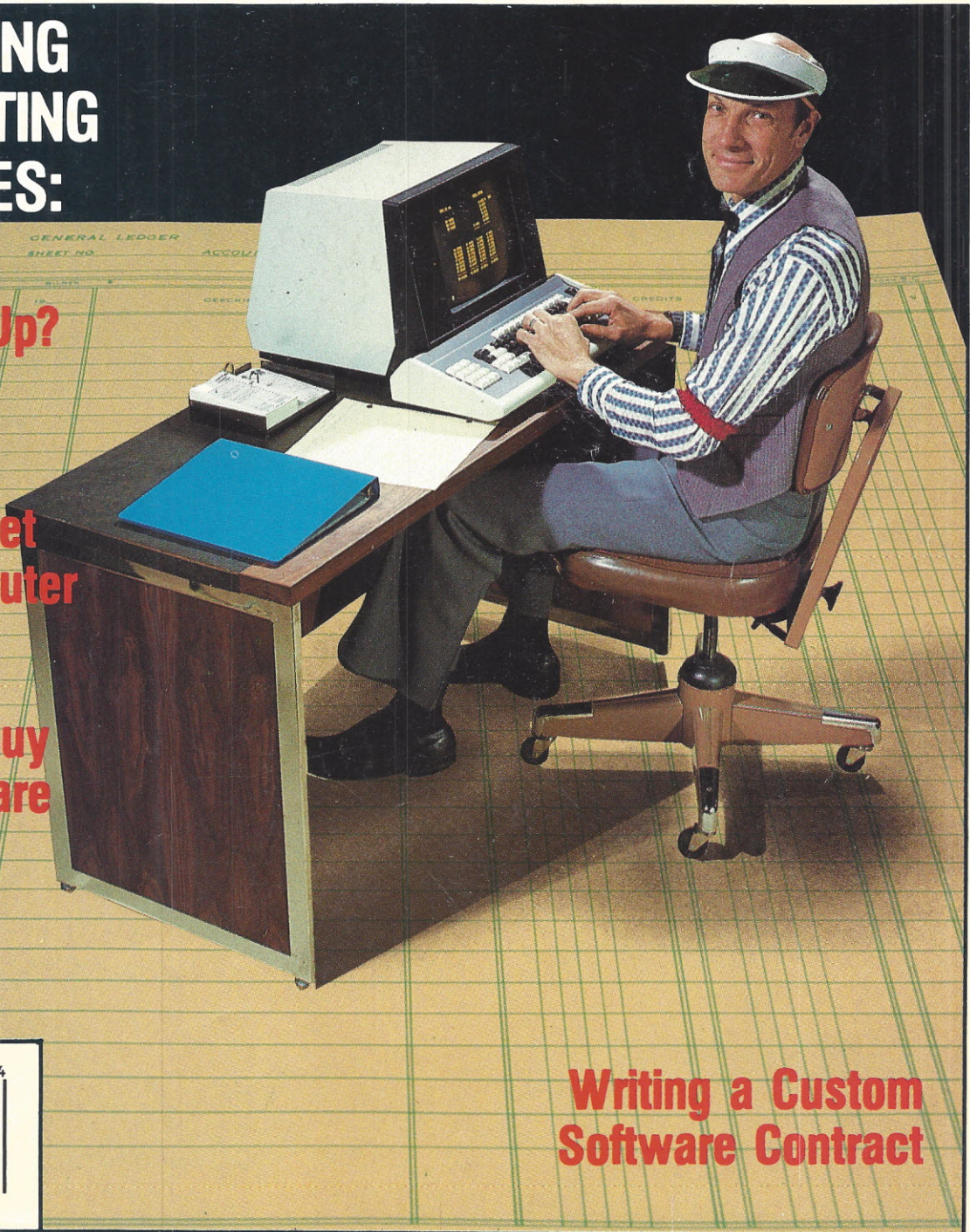
TX 76308



51

04

Writing a Custom
Software Contract



THINKING

MULTIPROCESSING?

THINK TELETEK'S SBC-1

Teletex's SBC-1 is designed to be implemented in a high-performance S-100 multiprocessing system. With its own CPU, serial ports, parallel ports, CTC, 128k of segmented memory and 1k or 2k FIFO, the SBC-1 is the most powerful S-100 slave processor available today.

- System may run at 4MHz with SBC-1 running at 6MHz
- Z80A or Z80B processor
- Two serial ports
 - RS232 port with software selectable speeds
 - RS422 port for high-speed communications
 - communication to a synchronous modem
- CTC provides counter/timer outputs available to the user
- 128k of segmented memory partitioned into 4k segments which can be dynamically addressed on any 4k boundary of the CPU address space
- 2k, 4k, or 8k of EPROM for initialization routines (may be disabled after completion of routines)
- 1k or 2k FIFO allows efficient communication to the bus master
- Two parallel ports
- Three levels of reset are possible
- As many as 20 SBC-1s may be in use simultaneously
- Digital Research or Infsoft operating systems available

TELETEK

9767F BUSINESS PARK DRIVE
SACRAMENTO, CA 95827

(916) 361-1777



New Cromemco System One shown with our high-capability terminal and printer.

A new small computer that won't limit you tomorrow

Here's a low-priced computer that won't run out of memory capacity or expandability halfway through your project.

Typically, computer usage tends to grow, requiring more capability, more memory, more storage. Without a lot of capability and expandability, your computer can be obsolete from the start.

The new System One is a real building-block machine. It has capability and expandability by the carload.

Look at these features:

- **Z80-A processor**
- **64K of RAM**
- **780K of disk storage**
- **CRT and printer interfaces**
- **Eight S-100 card slots, allowing expansion with**
 - color graphics
 - additional memory
 - additional interfaces for telecommunications, data acquisition, etc.
- **Small size**

GENEROUS DISK STORAGE

The 780K of disk storage in the System One Model CS-1 is much greater than what is typically available in small com-

puters. But here, too, you have a choice since a second version, Model CS-1H, has a 5" Winchester drive that gives you **5 megabytes** of disk storage.

MULTI-USER, MULTI-TASKING CAPABILITY

Believe it or not, this new computer even offers multi-user capability when used with our advanced CROMIX* operating system option. Not only does this outstanding O/S support multiple users on this computer but does so with powerful features like multiple directories, file protection and record level lock. CROMIX lets you run multiple jobs as well.

In addition to our highly-acclaimed CROMIX, there is our CDOS*. This is an enhanced CP/M† type system designed for single-user applications. CP/M and a wealth of CP/M-compatible software are also available for the new System One through third-party vendors.

COLOR GRAPHICS/WORD PROCESSING

This small computer even gives you the option of outstanding high-resolution color graphics with our Model SDI interface and two-port RAM cards.

Then there's our tremendously wide range of Cromemco software including packages for word processing, business, and much more, all usable with the new System One.

ANTI-OBSOLESCENCE/LOW-PRICED

As you can see, the new One offers you a lot of performance. It's obviously designed with anti-obsolescence in mind.

What's more, it's priced at only \$3,995. That's considerably less than many machines with much less capability. And it's not that much more than many machines that have little or nothing in the way of expandability.

Physically, the One is small — 7" high. And it's all-metal in construction. It's only 14 1/8" wide, ideal for desk top use. A rack mount option is also available.

CONTACT YOUR REP NOW

Get all the details on this important building-block computer. Get in touch with your Cromemco rep now. He'll show you how the new System One can grow with your task.

*CROMIX and CDOS are trademarks of Cromemco Inc.

†CP/M is a trademark of Digital Research

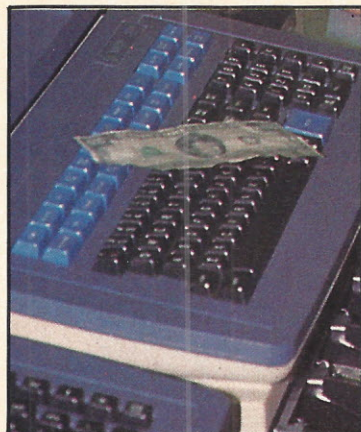


CromemcoTM
i n c o r p o r a t e d

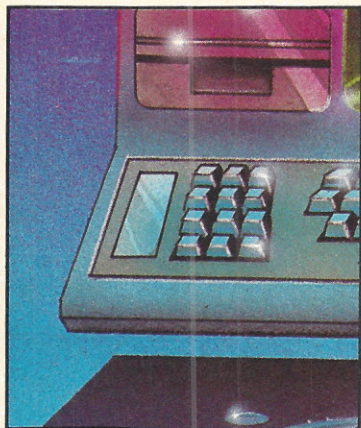
280 BERNARDO AVE., MOUNTAIN VIEW, CA 94040 • (415) 964-7400
Tomorrow's computers today

INTERFACE AGE™

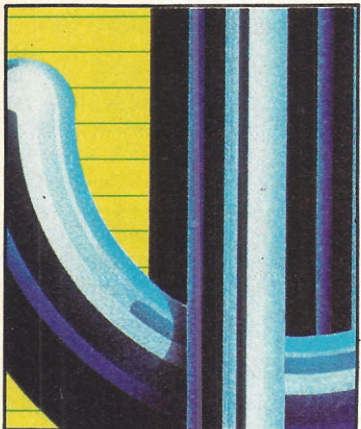
COMPUTING FOR BUSINESS AND HOME APPLICATIONS



The Retail Market Goes Computer 68



Word Processors for the TRS-80 76



General Ledger Software in the Balance 84

Cover model: Bob Jackson



INTERFACE AGE Magazine, published monthly by McPheters, Wolfe & Jones, 16704 Marquardt Ave., Cerritos, CA 90701. Subscription rates: U.S. \$18.00, Canada \$24.00, all other countries \$35.00. Make checks payable in U.S. funds drawn on a U.S. bank. Opinions expressed in by-lined articles do not necessarily reflect the opinion of this magazine or the publisher. Mention of products by trade name in editorial material or advertisements contained herein in no way constitutes endorsement of the product or products by this magazine or the publisher. Circulation Department, (213) 926-9540.

INTERFACE AGE Magazine COPYRIGHT ©1982 by INTERFACE AGE Magazine Inc. ALL RIGHTS RESERVED. Materials in this publication may not be reproduced in any form without permission. Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by McPheters, Wolfe & Jones for libraries and others registered with the Copyright Clearance Center (CCC), provided that the flat fee of \$1.50 per copy of each article is paid directly to CCC, 21 Congress Street, Salem, MA 01970. Special request be designated to Eva Lewis. ISSN 0147-2992/82 \$1.50 0.00.

INTERFACE AGE Magazine is catalogued in the Library of Congress, Classification No. QA75.5.155, USPS No. 580-310, ISSN Publication No. 0147-2992.
POSTMASTER: Please send change of address form 3579 and undelivered copies to INTERFACE AGE Magazine, 16704 Marquardt Ave., Cerritos, CA 90701. Second class per Lincoln, Nebraska and Artesia, California.

FEATURES

- Assignment: Benchmark/Wang 2200SVP**by Hillel Segal
Enhanced system in the 2200 line. 54
- Hardware Evaluation: Epson MX-100 Printer**by Roger H. Edelson
Full-sized and full-featured addition to printer line. 56
- System of the Month: Dynabyte 5055**by Tom Fox
Mini-Winchester drive highlights this system. 62
- The Retail Market Goes Computer**by Terry Benson
A look at computer applications for retail outlets. 68
- Word Processing Software**by David D. Busch
Comparison of programs for the TRS-80. 76
- Business Software Forum: General Ledger Software**by Carl Heintz
Balancing the features of several GL packages. 84
- Data Base Managers: Four for the Apple**by Voyle A. Glover
Reviewing four DBMS programs. 96
- CalcStar: Good Grades for Flexibility**by Rocky Smolin
Latest VisiCalc-like program scores high marks. 102
- Multiprocessor Networks**by Bernard Conrad Cole
Is the multi-microprocessor a viable alternative to the mainframe? 114
- Negotiating for your Software**by Reginald D. Gates
How to ensure a successful custom software contract. 118
- Where to Buy your Software**by Louis E. Frenzel, Jr.
Discussing sources for software selection. 122
- Software Review: Sorcim's SuperCalc**by Alan R. Miller
Evaluating another VisiCalc-like program for CP/M. 126

COLUMNS

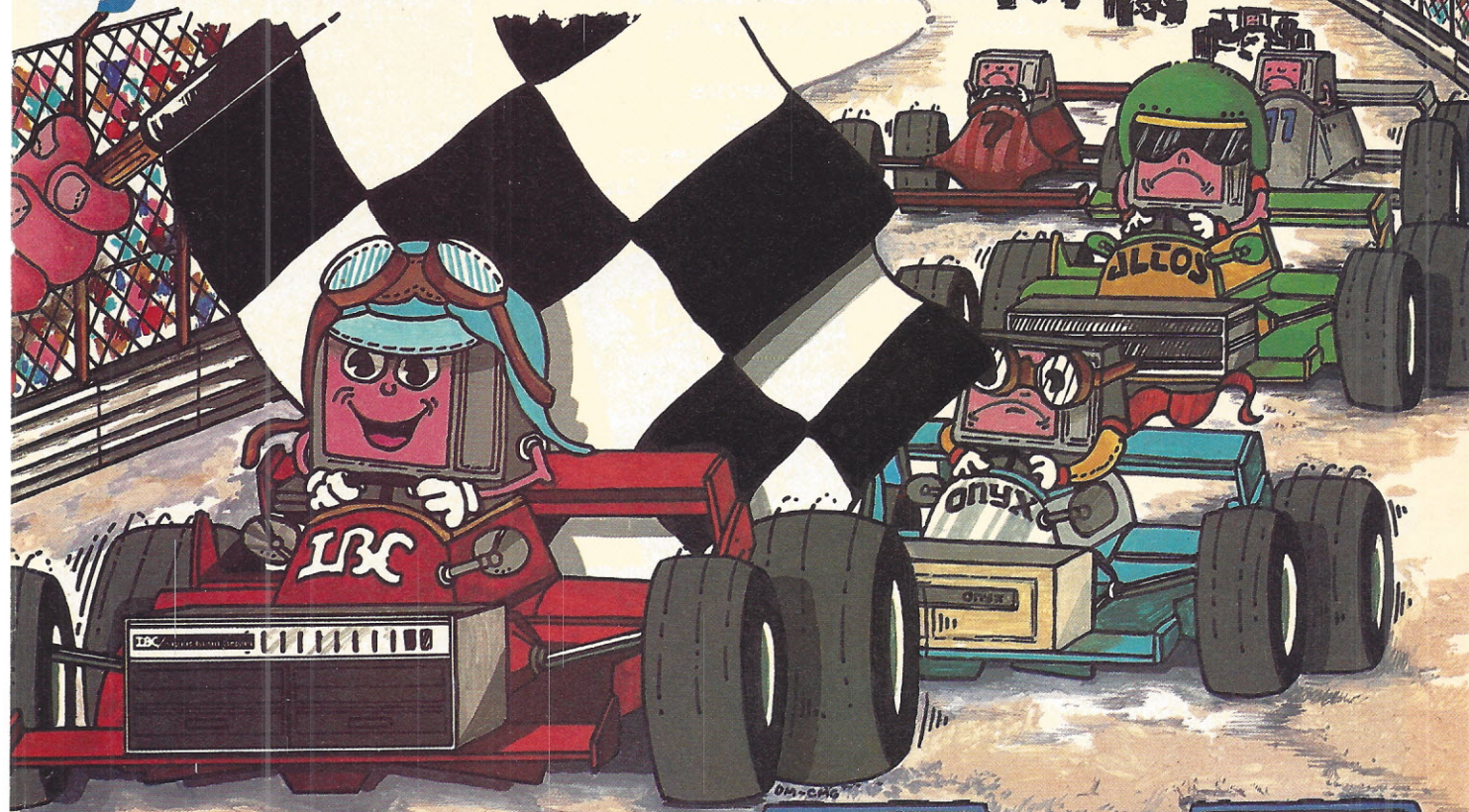
- Game Corner: Fog index revisited** 22
- Inventor's Sketchpad: Flat panel display with depth** 24
- Micro Mathematician: Business forecasting** 34
- Learning with Micros: IBM in the educational market** 42
- Apple-ications: Word processing language** 44
- Commodore Logbook: VisiCalc applications** 48
- Power in your Pocket: Peek at the Panasonic** 52

DEPARTMENTS

- Editor's Notebook** 6
- Letters to the Editor** 11
- Update** 18
- New Products** 128
- Calendar** 140
- Book Reviews** 142
- New Literature** 146

Contact authors by writing to them at INTERFACE AGE, P.O. Box 1234, Cerritos, CA 90701.

And The Winner Is... IBC By Four Users!



When you are racing toward that finish line, beating the competition is everything. IBC is the choice of OEM's, system integrators and dealers throughout the world, because in benchmark after benchmark our small business computer systems finish first.

We finish first because we are faster, offer higher quality peripherals and can expand our system significantly beyond our nearest competitors. In fact, looking at the chart below, you can quickly see why knowledgeable resellers are choosing IBC.

CIRCLE INQUIRY NO. 49

	IBC	onyx	ALTOS
Oasis Operating System (Max. Users)	9	5	4
CPU Speed (MHz)	6	4	4
Disk Speed I/O (MB/Sec.)	.81	.65	.54
Seek (Milli Sec.)	35	50	65
Cache Disk Memory	Yes	No	No



Join us in the winners circle with high performance equipment and the best dealer plan in the industry. Call or write:

OUTSIDE THE USA

IBC/Integrated Business Computers

21592 Marilla Street
Chatsworth, CA 91311
(213) 882-9007 TELEX NO. 215349

WITHIN THE USA

IBC/DISTRIBUTION

4185 Harrison Blvd., Suite 301
Ogden, UTAH 84403
(801) 621-2294

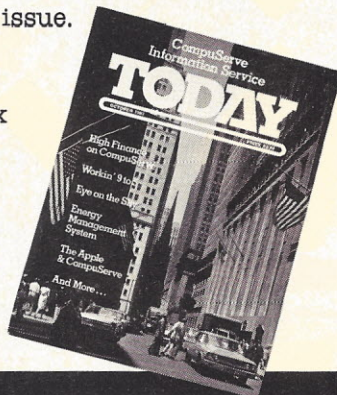
TODAY

TODAY's just another good reason to be a subscriber to the CompuServe Information Service. Because TODAY is a magazine published free-of-charge for our customers and also offered to others interested in the latest developments in the growing videotex industry.

TODAY includes new and current product and service offerings on the System, technological developments at CompuServe and in the industry, customer profiles, features on information providers and announcements of special events. An extensive subject index appears in each issue.

Ask for a demonstration of the CompuServe Information Service at a Radio Shack® Computer Center. Videotex software is available for various brands of personal computers. CompuServe Information Service, 5000 Arlington Centre Blvd., Columbus, Ohio 43220. (614) 457-8650

CompuServe



CIRCLE INQUIRY NO. 21

Now add time-keeping capability to your RS-232C compatible computer. The Hayes Chronograph calendar/clock coordinates and logs system activities by date and time... down to the second.

The Chronograph is ideal for business or home applications. Use it with your computer for timing everything from time-sharing access... to electronic mail and lights and sprinklers.

Hayes Stack™

Microcomputer Component Systems

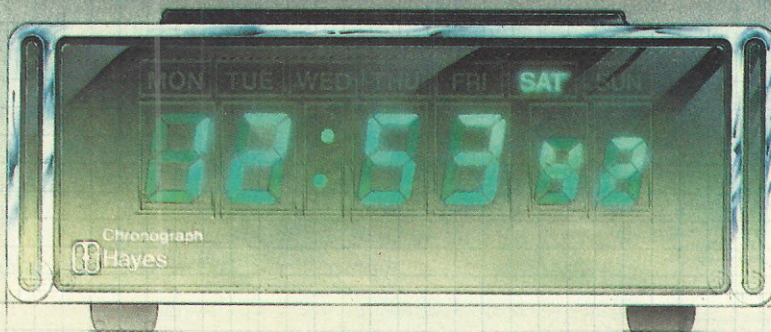
Plus Chronograph is designed to stack neatly on top of other Hayes Stack component systems — like the RS-232C compatible Smartmodem. (Each requires a dedicated RS-232C port.)

Keep your computer system up-to-date with the Hayes Stack Chronograph. Only \$249 at computer stores everywhere. There's no better time.



The Hayes Stack™ Chronograph

It's time. And it's now.



Hayes Microcomputer Products Inc. 5835 Peachtree Corners East, Norcross, Georgia 30092 (404) 449-8791
Hayes Stack is a trademark of Hayes Microcomputer Products, Inc.
© 1981 Hayes Microcomputer Products, Inc. Sold only in the U.S.A.

CIRCLE INQUIRY NO. 42

INTERFACE AGE

Robert S. Jones
Nancy A. Jones
Mike Antich

Publisher, Editor-in-Chief
Executive Publisher
Publication Director

Editorial

Managing Editor
Associate Editor
Assistant Editor
Technical Editors

Contributing Editors

Les Spindle
Ralf Korbner
Dave Nowakowski
Terry Benson
Tom Fox
David D. Busch
Bernard Conrad Cole
Roger Edelson
Louis E. Frenzel, Jr.
Roger C. Garrett
Carl Heintz
Bob McElwain
Alan R. Miller
John C. Nash
Leah O'Connor
Patrick O'Connor
Hillel Segal
Rocky Smolin

Production

Production Manager
Art Director
Artists

Typographer

Terri Ledesma
Fino Ortiz
Arlene DeVera
Patricia Perez
Suzi Pippin

Administration

Accounting Supervisor
Accounting Assistants

Assistant-to-the-Publisher
Circulation Manager
Circulation Assistants

Publication Assistants

Kay Lee
Julie Duby, Shirley Mazenko
Eva Lewis
Colin Cato
Stephanie Barber,
Sheila Drury, Mary Garand
Cheryl Johnston, Lilly Lisa

Advertising

Boston
7 Lincoln St., Wakefield, MA 01880
(617) 245-9105

New York
355 U.S. Route 46, Mountain Lakes, NJ 07046
(201) 625-8660, (201) 625-8661

Charlotte
3938 Sussex Avenue, Charlotte, NC 28210
(704) 552-1004

Chicago
5901 N. Cicero Ave., Chicago, IL 60646
(312) 545-8621

Dallas
2312 Canyon Valley Trail, Plano (Dallas), TX 75023
(214) 596-1139

Santa Clara
1333 Lawrence Expy., Ste. 150C,
Santa Clara, CA 95051
(408) 296-2121

Los Angeles
P.O. Box 1234, Cerritos, CA 90701
(213) 926-9544

Interface Age Europe

Representative
8046 Garching, Dirnismaring 32A
West Germany
Telephone: 089-3204902

International Newsstand Distribution

Director
Orberstrasse 38, D-6000 Frankfurt/M. 61
West Germany
Telephone: (0611) 44 77 90/41 84 80

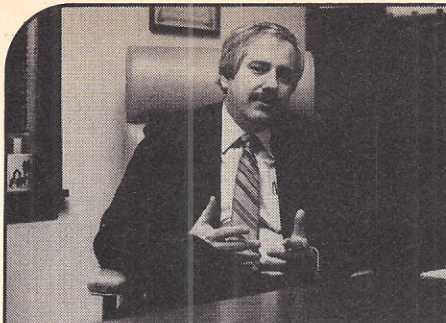
International/Domestic Retail Circulation

(213) 926-9544 **Julie Duby**

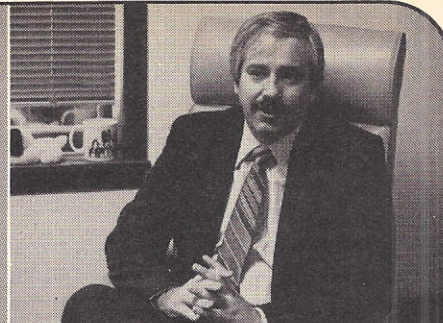
UK Distributor

Seymour Press Limited
334 Brixton Rd.
London SW9 7AG
Telephone: 01-733 4444

16704 Marquardt, Cerritos, CA 90701
(213) 926-9544
TWX (910) 583-1412



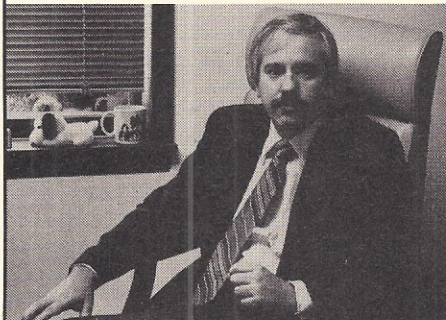
Digital Scientific®



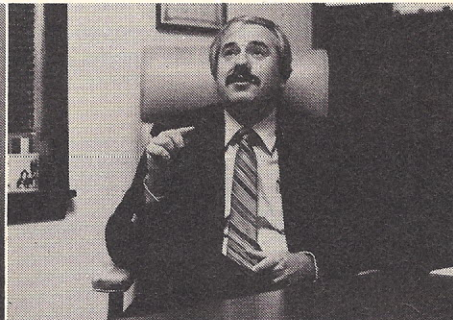
"People are beginning to realize that the InfoSoft operating system has some real advantages," says Tom Hayes, Manager of

Systems Development of Digital Scientific Corporation, San Diego, CA. "Our newest product, the META 4/2000, is packaged with

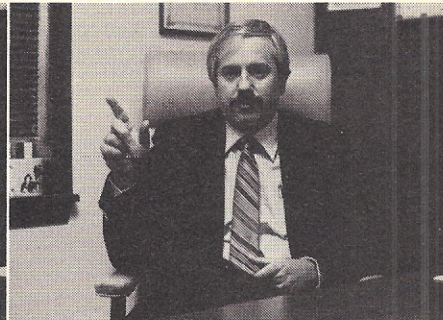
I/OS, InfoSoft's single user system. It has extended system calls and the ability to support a far wider range of devices than CP/M®



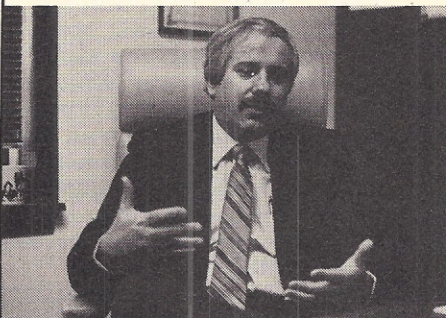
We've contracted with InfoSoft to develop an operating system for network as well. We'll be using our META 4/1000 8-bit machine



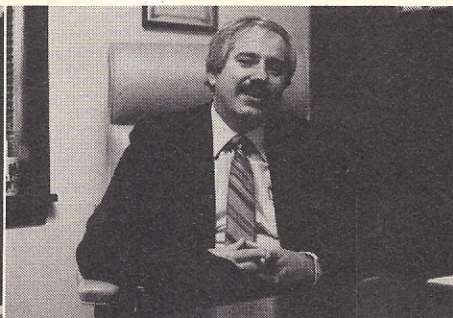
and be able to hook up anywhere from 6 to 16 users. The whole system will be ready to go before the end of the year. I've used



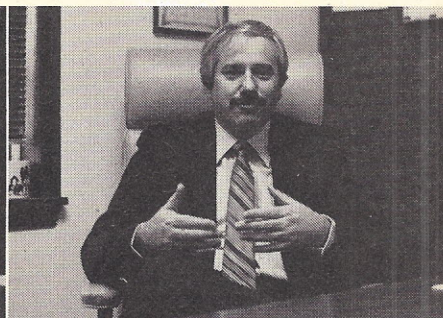
both CP/M and I/OS, and I/OS is much more user-friendly and easier to use. We have no problems packaging the InfoSoft



system with our machines because it will run virtually anything that will run under CP/M, and once we've clearly laid out the advan-



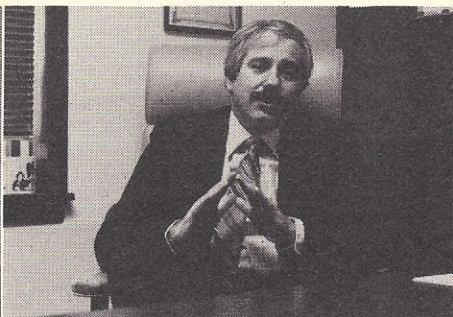
tages, our dealers and users know it's better. Certainly the high end growth in the computer business over the next 5 years is



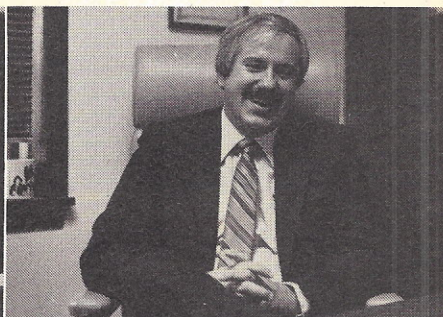
going to be in small machines. A network of micros will allow many small businesses to boost productivity. However, it is very



important to present the businessman with a complete turnkey package. He doesn't have, nor does he want to have, the expertise



to determine what pieces he needs. So, we give him a machine that makes service easy, an operating system with broad



capabilities like those designed by InfoSoft, and all the applications software, all wrapped up in one easy-to-use package."

Success with I/OS leads to success with Multi/Net

The InfoSoft family of operating systems, I/OS for the single user, Multi/OS for the multi-user, and Multi/Net for the network user, have been found to be user-friendly, and available at lower cost with full support. Contact us for complete details — we answer our phones 24 hours a day.

25 SYLVAN ROAD SOUTH
WESTPORT, CT 06880, (203) 226-8937

CP/M® is a registered trademark of Digital Research, Inc.

InfoSoft

SYSTEMS INCORPORATED



EDITOR'S NOTEBOOK

Viva Las Vegas

The present recession is supposed to be the first one that has significantly affected Las Vegas, but when this year's International Winter Consumer Electronics Show (CES) came to Las Vegas, the recession apparently took the weekend off. Well over the originally estimated 60,000 attendees paraded through not just the Las Vegas conven-

tion center, but also the Hilton Hotel and the Jockey Club Hotel. With the 25th CES being the largest convention to hit Las Vegas, the already large convention center could not contain the wizardry of electronics that has become the way of life for the American consumer.

With almost 1,000 exhibitors spread throughout the three areas and with overflow capacity at the convention itself, it was difficult to visit the booths in which

we had primary interest, let alone see all of the exhibits. In wandering through the show, we detected that there must have been an unannounced theme: video. There were video accessories, cassettes, disk players, recorders, video games and, yes, even home computers.

In a glamour town like Las Vegas, we fully expected to see dancing girls and flashing lights...but no! These were replaced with TV screens. The major promoter of this concept had to have been JVC with 65 TVs simultaneously displaying a music concert by some current popular singers. Next in line for multi-screens was Magnavox with 58 TVs. Overall, Sony has to be the winner of the show in terms of numbers of TV sets—and the Sony TV division didn't even have an exhibit. The Sonys were used by other manufacturers to display more than 100 video games.

In addition to these electronic arcade games, several manufacturers were demonstrating the newer home computer systems. Atari and Mattel each had over 40 operating games and all had lines of people waiting to play—and these were *adults*. It appears that the game market for the microcomputer products is going to help proliferate the use of these new electronic marvels in the home for both children and adults. This certainly can't be all bad.

Two of the companies fighting for this home computer market are Commodore with its expanded line of Vic 20 products and a new low cost Ultimax. This \$150 unit will be offered in direct competition with Atari and Mattel, but the Ultimax offers complete computing capability in addition to the expected games. The Commodore 64 (\$595) is an advanced home computer to compete with the Atari 800—and maybe even the Apple II. Mattel, on the other hand, is finally offering the long-awaited keyboard component. Originally introduced in late 1979 (IA Aug/Sept 79), it uses the master component, or game module, as the primary controller to provide a complete home computer system. At \$500, the cost of the keyboard component will be over twice the originally suggested price two years ago. It is presently being test-marketed in five cities, and it will take several more months to assess the market acceptance. It seems Mattel is finally on the right track.

It looks like the easiest way to get a computer accepted into the home is to offer it to the game players who aren't always just the children. Of course, there'll be some who claim that the video-game-turned-computer is useless. But if this is the only way to get the

RELAX!



This year, let your personal computer do the time-consuming tax preparing. Use your accountant for his expert advice, but save him from the manual labor of preparing returns.

The **TAX PREPARER** by HowardSoft™ is a professional software package that turns your computer into an error-free tax machine bypassing the aggravation and human error that usually come at tax filing time. The broad acceptance of our package has allowed us to keep the price within reach of the individual and the small businessman.

But don't be fooled by the low price. Our package is recognized by experts as the best tax package available for personal computers. On-screen previewing, year-long record-keeping, year to year updating, printouts for direct filing, and easy error correction are just a few of the features. See for yourself at your local computer store why numerous tax practitioners have put their trust in our product.

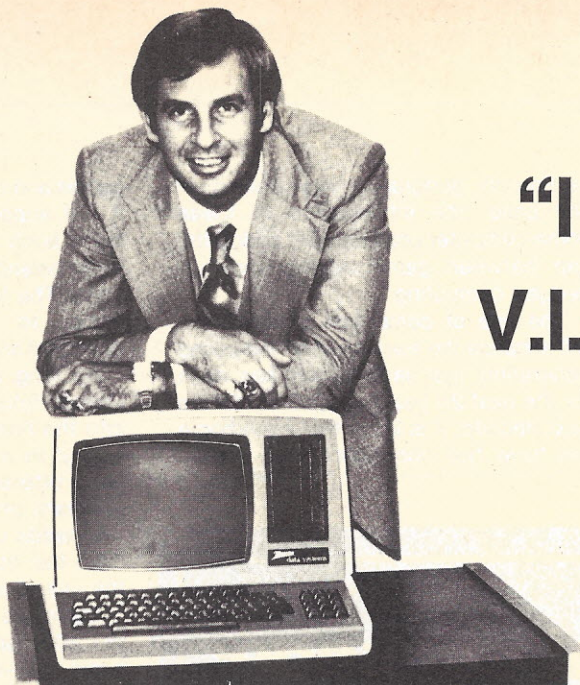
\$150 for the basic Federal package with 20 popular forms and schedules (1040, A, B, C, D, E, F, G, R, RP, SE, 2210, 2106, 3468, 4562, 4726, 4797, 5695, 2119, 4625 and 6251)



Howard Software Services

...for the SERIOUS Personal Computer User

8008 Girard Ave., Suite 310 | La Jolla, CA 92037 | (714) 454-5079



**"I found out why
V.I.P.'s call A.E.I."**

I learned that I could get *specific advantages* when purchasing from A.E.I.

A.E.I. has valuable knowledge gained from selling millions of dollars of computer equipment, and will take the time to discuss which equipment is right for me.

Based on its vast experience, A.E.I. sells only reliable equipment.

A.E.I. can test and configure equipment to match my system.

A.E.I. will initialize my software to match my system, saving me valuable time.

A.E.I. stocks repair parts and can answer my

technical questions, and expedite repairs to my equipment when necessary.

A.E.I. is price competitive even when compared to No-Service sales companies.

I learned that 40% of all A.E.I. sales are to public and semi-public institutions,* such as the Universities of Nebraska, Virginia, Kentucky, California, M.I.T., the U.S. Air Force, Princeton; as well as scores of major corporations.

Calling A.E.I. is the *smart* thing to do.

*A.E.I. does not wish to imply that any of these fine organizations endorse A.E.I., merely that A.E.I. is proud to have them as customers.

A PARTIAL LIST OF PRODUCTS AVAILABLE AT A.E.I.



TELEVIDEO COMPUTER

	List	Sell
TS-800 User Station	1795	1450
TS-801 Computer	3295	2650
TS-802 Comput/Terminal	3495	2796
TS-802H Comput/Terminal	6995	5596
TS-806 Multi User Proc.	7195	5749



TELEVIDEO TERMINALS

	List	Sell
910 Terminal	699	575
912 Terminal	925	659
920 Terminal	995	725
925 Terminal	995	750
950 Terminal	1195	900



NEC PRINTERS

	List	Sell
3510-1 30CPS Serial	2450	2050
7710-1 55CPS Serial	CALL	CALL
7720-1 KSR Serial	CALL	CALL
Forms Tractors	CALL	CALL



NORTHSTAR HORIZON PRODUCTS

	List	Sell
HR2-20-64K	4495	3149
HR2-10-64K HD5	6695	4999
HR2-10-64K HD18	9270	6749

NorthStar is discontinuing many of their horizon products. Call for availability and price of any product not listed.



NORTHSTAR SOFTWARE

	List	Sell
Northword D/Q	399	295
Mailmanager D/Q	299	235
Informanager D/Q	499	365
General Ledger D/Q	599	475
A/R D/Q	599	475
A/P D/Q	599	475



TEXAS INSTRUMENTS PRINTERS

	List	Sell
TI-810 BASIC	1645	1398
TI-810 Full ASCII	1745	1479
TI-810 Package	1945	1649
TI-820 R/O BASIC	1995	1625
TI-820 KSR Package	2395	1950



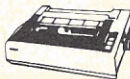
NORTHSTAR ADVANTAGE COMPUTER

	List	Sell
ADV-20-64K	3995	CALL
SIO Board	175	CALL
PIO Board	200	CALL
FPB Board	399	CALL
Graphics Option	299	CALL



MODEMS

	List	Sell
Cat Modem	189	140
D-Cat	199	150
Auto-Cat	249	190
Apple-Cat	389	310
DC Hayes Micro-100	379	330
DC Hayes Smart Modem	279	240



EPSON PRINTERS

	List	Sell
MX-80	645	CALL
MX-80 FT	745	CALL
MX-100	995	CALL

Call for pricing on interfaces and cables



MORROW DECISION COMPUTER

	List	Sell
Decision 1 BASIC	1725	1350
Decision 2	CALL	CALL
65 K Static Ram	1000	780
Switchboard I/O	259	210

Select drives from Morrow disc systems for desired configuration.



MORROW DISC SYSTEMS

	List	Sell
Discus 2D 1 Drive	1095	849
Discus 2D 2 Drive	1875	1389
Discus 2 + 2 1 Drive	1395	1075
Discus 2 + 2 2 Drive	2495	1859
M26 Hard Disc	4495	3395

C/P/M & Microsoft Basic Included



LINE PRINTERS

	List	Sell
Okidata 82A	719	550
Okidata 83A	1195	899
Anadex 9500	1650	1285
Anadex 9501	1650	1285



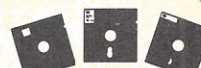
SYSTEMS GROUP

	List	Sell
2800 Computer	5035	3595
DM-6400 Memory	760	585
DMB-6400 Memory	995	735
CPC-2813 CPU + I/O	460	365
FDC-2801 Controller	465	370



MICROPRO SOFTWARE

	List	Sell
Wordstar	495	330
Apple Wordstar	375	275
Spellstar	250	190
Mailmerge	150	100
Datatar	350	250
Supersort	250	190



DISC-CABLES

	List	Sell
Memorex 5" 1D	47	27
Memorex 5" 2D	55	36
Verbatim 5" 1D	40	30
Verbatim 5" 2D	55	45
RS-235 5' Cable	30	20
RS-232 10' Cable	40	25

—SEE THESE PRODUCTS AND MORE IN OUR SHOWROOM—
PRICES CHANGE DAILY—CALL OR VISIT FOR CURRENT PRICING



AUTOMATED EQUIPMENT, INC.

18430 WARD STREET, FOUNTAIN VALLEY, CALIFORNIA 92708

Calif. and International:
(714) 963-1414

Out of State:
(800) 854-7635

computer into the home, then so be it. With prices as low as \$150—but generally less than \$800—more and more families can afford a true computer. With the addition of a TV, not only can game playing operate on the system, but even computer concepts can be learned. Commodore offers an introduction to Basic course for the new system while Mattel, so far, is sticking to non-computer related education, such

as French, geography and spelling. In any case, the introduction of these home computer products will bridge the gap between game playing and full-fledged computing.

The use of computers in the home will enhance the awareness of the young generation, just as television has done for the past 20 years. In fact, within the next decade, it is likely that each home will have two computers, one playing

games and one really computing. Initially, it will support some of the mundane tasks such as home budgeting, check-book balancing and the other common ones. The home computer will become easier to use, more useful, more accepted and, certainly, more affordable.

As long as the manufacturers plan ahead, future expansion can be built into the home computer, so that it can be put to effective use. With the flexibility offered by a keyboard, enhanced software products can easily adapt to the needs of the homeowner and help train the homeowners of tomorrow in the use of a computer system.

Casio has even introduced a computer (\$1,200) specifically directed toward home use—but without the normal game emphasis. We don't mean to imply that these under-\$1,000 systems are to be considered for business applications too—but certainly some will be used that way. We suppose that such a system could be considered as a starter unit to be used until the owner decides to step up to the higher capability system with multiple terminals, floppy disks, hard disks, printers—and higher cost. In the meantime, the users buying the \$500 systems can expect to be operating them for many years. The computer may even replace watching TV trivia—especially if the TV is used as the computer's output device. Would you rather watch *I Love Lucy* or play *Space Invaders*? —TB

The powerful package:

Super-Text II™

Allows you to learn the basics of text editing quickly. Advanced features will meet your expanding word processing requirements far into the future. \$150.00

plus Form Letter™

Provides automatic repetitive printing of letters. Allows insertion anywhere in a letter, also direct entry, optional prompting, special commands. \$100.00

plus Address Book™

Stores names, addresses, and telephone numbers and prints mailing labels. Has user-definable category system. \$49.95

**From the leader in word processing
for the Apple II or II Plus**

MUSE SOFTWARE™

Apple II is a trademark of Apple Computer Corp.

347 N. CHARLES STREET
BALTIMORE, MD 21201
(301) 659-7212

Call or write for information and the name of your nearest MUSE dealer

COMING IN MAY

Systems Reviews:
Commodore Vic 20
Casio FX-702P
Apple III

●
Comparing
Proofreading
Programs

●
New Techniques in
Computer Animation
(Exclusive photos of
Walt Disney Productions'
Tron)

INTRODUCING PERFECT WRITER.TM NOW, GET THE FINEST WORD PROCESSOR AT ANY PRICE FOR JUST \$289.00

AND GET OUR INCREDIBLE, MONEY-BACK GUARANTEE!

That's right. If you own an Apple II, Heath/Zenith, TRS-80 model II, North Star, Osborne I, Superbrain, Micropolis/Vector, or CP/M 8," you can now afford the most advanced, yet easy-to-use, word processor on the market today.

But don't take our word for it. See for yourself.

We're so sure you'll be amazed by Perfect Writer's easy-to-use features and capabilities, that we'll let you try it for thirty days and give you your money back if you're not completely satisfied!

FEATURES AND FLEXIBILITY YOU HAVE TO SEE TO BELIEVE.

Looking for the advanced features you'd expect to find in the most expensive word processors? Perfect Writer has them. Like automatic formatting of letters, out-lines, reports, memoranda, articles, books, or other types of documents.

What makes Perfect Writer unique, are the features you won't find in word processors costing many times its price.

Like the incredible sophistication of Virtual Memory Architecture, that lets you edit a full-length novel as easily as you'd edit a letter.

Or a remarkable breakthrough called Split Screen EditingTM that lets you divide the screen into two parts, each showing a different document, and transfer sections of text between the two!

And that's just the beginning. Perfect Writer offers much, much more:

- Automatic numbering of pages, chapters, sections, footnotes, internal page references, and automatic generation of table of contents and indexes.
- Mail merging capability allows generation of form letters and more.
- Automatic carriage return, auto-centering, tab setting, and automatic placement of footnotes.
- Quick and easy cursor commands.
- Easy deleting and inserting procedures.
- Safe and convenient storage of materials.
- Searches for and replaces words and phrases in a document, including near misses.
- Full range of printing options, including right margin justification, micro-spacing, super and subscripts, italics, and bold face.
- And lots more.



Perfect Writer.
The remarkable word processor
combining sophistication and
simplicity.

MONEY BACK GUARANTEE.

Try Perfect Writer for 30 days at our risk. If you're not completely satisfied, return it for a prompt, complete refund.

PERFECT WRITER IS EASY TO USE.

WE GUARANTEE IT.

When we say that Perfect Writer is easy to use, we mean it. That's why we're not afraid to offer a money back guarantee.

You see, Perfect Writer was designed to be simple. In fact, you don't even have to read our crystal-clear manual in order to use Perfect Writer. The pictures, diagrams and illustrations tell you all you need to know, so you're off and running in no time.

There are no difficult and awkward procedures and commands to learn. We guarantee it.

ORDER NOW. WHAT HAVE YOU GOT TO LOSE?

If you'd like to own the most sophisticated word processor on the market today at the current, introductory price of just \$289.00, we invite you to order now.

Perfect Writer is completely guaranteed, so there's no risk of any kind. Why not see for yourself what this incredible new software breakthrough can do for you?

TO ORDER CALL TOLL FREE: 1-800-221-2486
IN NEW YORK CALL: 1-212-619-4000

WRITE: COMPUTER SERVICES CORPORATION OF AMERICA
71 MURRAY STREET
NEW YORK, NEW YORK 10007

Yes. I want to see for myself if Perfect Writer is as great as you say it is. So please send it to me, subject to the guarantee printed on this page.

☐ Perfect Writer and Manual \$289.00

I also want to order, subject to the same guarantee:

☐ Perfect Speller \$189.00

☐ Perfect Sort \$189.00

☐ Perfect Mailer \$189.00

Name

Address

City, State, Zip

☐ MasterCard



☐ American Express



☐ Visa



Number Expires

TRY THESE OTHER PERFECT SOFTWARE PRODUCTS (THE SAME MONEY BACK GUARANTEE APPLIES).

Perfect SpellerTM: The best automatic proofreader available! Perfect Speller uses its 20,000 word dictionary to proofread your document and catch all your spelling mistakes. (Dictionary size limited only by your system's storage capacity.) You can add words to the dictionary, build separate dictionaries, change the dictionary, and more. \$189.00 guaranteed.

Perfect MailerTM: It's more than a mail merging or form maintenance system! Perfect Mailer can organize and sort your correspondence, develop sophisticated mailing systems, and keep track of your correspondence. Don't miss this remarkable new software innovation! \$189.00 guaranteed.

Perfect SortTM: Here's a sort/merge/extract program that operates on all kinds of data! Records can be fixed or variable, with a variety of variable length fields. Files can be examined using comparison and logical operators. Want speed and efficiency? You've got to have Perfect Sort! \$189.00 guaranteed.

© 1982 Computer Services Corporation of America



Fill this space with a GRAFTRAX graphic
and win a trip to Japan.

The Epson "Softwear" Sweepstakes.

We're looking for the Picasso of programming. So we drew up an art contest for people who don't know a painting pallet from a PROM.

If you've got an Epson printer, a computer and a little imagination, you could win a week-long trip for two to Japan. Or our top-of-the-line 136-column MX-100 printer. Or his and hers Seiko Quartz Watches. Or a whole lot of honorable mention prizes. And you'll get a T-shirt with the winning graphic just for entering.

All you have to do is program a GRAFTRAX graphic — abstract, landscape, still life, whatever — using an Epson MX-70, MX-80, MX-80 F/T or MX-100 printer. We'll not only put it on our T-shirts, we'll be displaying the winning entries for all to see in June at the National Computer Conference in Houston.

Why, you may ask, are we being so generous? It's simply because GRAFTRAX is the most incredible graphics capability made for micros. And we want to see it used to its full potential.

All entries will be judged on originality, creativity and best use of computer equipment. They must be postmarked no later than May 1, 1982, and be accompanied by the software program, so we can recreate the winning entries for verification. Make sure the graphic is no larger than 8" x 10" and no smaller than 4" x 6". And remember, if you digitize art or a photograph, it must have been originally created by you.

So get busy and enter.
You might be a winner.

And your software
could be your "soft-
wear."



EPSON
EPSON AMERICA, INC.

3415 Kashiwa Street • Torrance, California 90505



EPSON "SOFTWARE" SWEEPSTAKES RULES

- 1) Any computer equipment may be used to format the entry, but the graphics output must have been printed on an Epson MX-70, MX-80, MX-80 F/T or MX-100 printer with either built-in or optional GRAFTRAX. Winning entries will be re-created by Epson for verification.
- 2) Each entry must be accompanied by the software program used to create it. All entries and software and the rights to use them become the property of Epson America, Inc.
- 3) All entries must be at least 6"x 4" and no larger than 8"x 10" in size.
- 4) Art or photographs, if used, must have been created by the entrant.
- 5) All entries will be judged by an independent panel of judges on their creative merit, originality and best use of computer equipment. Decision of the judges is final.
- 6) This contest is valid from January 1, 1982 until May 1, 1982. Entries must be postmarked no later than May 1, 1982.
- 7) Participation in the Epson "Software" Sweepstakes is open to any except the following: employees of Epson America, Inc., its service agencies, or their families.
- 8) Winners will be notified by mail no later than June 1, 1982. A list of winners will be made available by sending a stamped, self-addressed envelope to Epson America, Inc., 3415 Kashiwa Street, Torrance, CA 90505.
- 9) Entries will be maintained on file at Epson America, Inc. until January 1, 1983.
- 10) Prizes are as follows: First prize includes round-trip economy air transportation for two to Tokyo, from the airport nearest the winner's place of residence, and six nights standard hotel accommodations, double occupancy. Trip does not include airport departure taxes, hotel service charges, cost of transportation or other expenses incurred before leaving the airport of initial departure, returning to Tokyo airport and returning home from the airport of initial departure; nor does it include meals or gratuities. Second prize consists of one Epson MX-100 Printer. Third prize consists of his and hers Seiko Quartz Watches. Additional prizes include 25 Micro-Nine Printheads, 50 Epson Digital Watches, and 100 Epson Ribbon Cartridges.
- 11) You may enter more than once, but each entry must be accompanied by the official entry coupon below.
- 12) Void where prohibited by law.

Attach this form firmly to the back of each graphic you enter.

NAME _____
STREET _____
CITY _____
STATE _____ ZIP _____
PHONE (____) _____
COMPUTER EQUIPMENT USED _____

PRINTER MODEL AND SERIAL NUMBER _____

T-SHIRT SIZE _____ S _____ M _____ L _____ XL

Mail entries to:
"SOFTWARE" SWEEPSTAKES
Epson America, Inc.
3415 Kashiwa Street
Torrance, California 90505

EPSON
EPSON AMERICA, INC.

APRIL 1982

LETTERS

Happy endings

Re: Daniel K. Hollis's letter about his difficulty replacing his Apple II's on-off switch (IA Jan 82), his story is similar to mine, but mine ends more happily. Like Mr. Hollis, I removed the power supply. I then simply pried off the switch with a small screwdriver, a procedure much simpler than removing rivets and a dozen screws. The switch is friction-fitted and not difficult to pop off. Electronics-supply stores stock replacements. After having replaced the switch, I purchased a six-outlet box with its own on-off switch, which enables me to bypass the Apple's switch whenever activating or shutting down my system, adding convenience and longevity to the whole shebang.

Allen H. Kelson
Chicago, IL

I fully sympathize with the gentleman who complained about the broken power switch on his Apple II computer. I have met this problem several times. We have 16 Apple IIs with 48K and individual disk drives in our microcomputer resource laboratory. These are used by over 250 students per year, eight periods per day, so the number of off-on cycles endured by the machines is phenomenal.

When our power supply switches began to go, replacements were found at the nearest Radio Shack store. A heavy duty toggle switch, catalog number 275-651, fits nicely into the hole and is secured with a large washer. We, too, had to remove twelve screws and two rivets; the rivet heads can be filed off easily as they are aluminum. Be careful to dispose of the filings carefully. The power supply is a marvel of engineering that supplies very pure D.C., but the switch is not adequate for the task.

The motherboard on the Apple is an extremely well built device and has few equals in the microcomputer world. It's too bad that a dumb thing like a switch detracts from an otherwise great machine.

One last note: Why has the disk drive motor been designed to come "on" even if the drive door is open and there is no disk in the slot? I've been trying to figure that one out for years!

John Occhuizzo
Norwin Microcomputer Center
N. Huntingdon, PA

Where credit is due

Re: "Apple-ications" (IA Sep 81), the author mentions Ted Perry as the creator of Block Author Languages (for the Apple). He did not create it at all. It was designed, programmed, envisioned and

written by Linda Slovic. Although Ted Perry often claims credit for it, his only participation was in a portion of the funding. The other person responsible for funding is Jacob Arcanin, Assistant Superintendent at the California School for the Deaf. Linda Slovic works at the California School for the Deaf under government grants. She is a deaf programmer. When Ted Perry goes on T.V. claiming to have written Block Author Language, there is not much that she can do. But she is very proud of her accomplishment and should be given appropriate credit for it.

Beth Slovic
Concord, CA

Latest benchmark challenge

Re: "Report Card: Benchmark" (IA Aug 81), I have been able to beat the best time you reported, for the TEI system/48 of 178 seconds. Using a NorthStar and N*DOS with the floating point board and Allen Ashley's Comstar Compiler to compile the NorthStar Basic program provided in the feature, the run time of the program was 156 seconds. I should also note that I have found this compiler very easy to use and that Allen Ashley has always provided excellent support for all his software. To me that represents at least half the reason for choosing any product—be it software or hardware.

Richard J. McCulloch
Calgary, Alberta, Canada

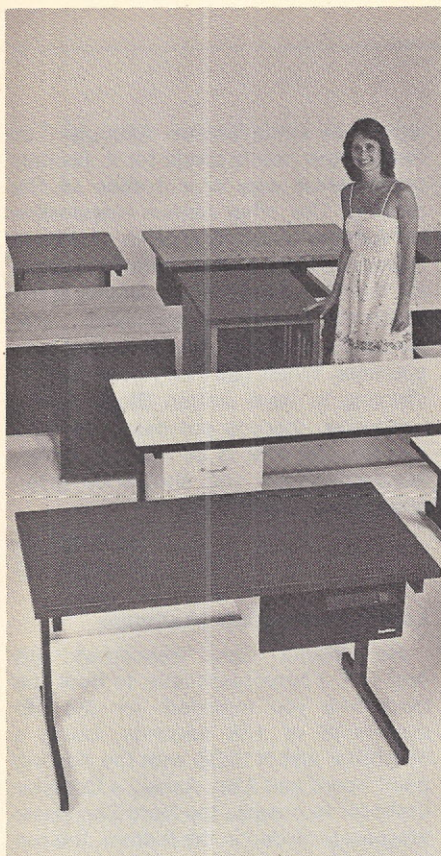
Tracking the TRS-80

Re: "Where Does the TRS-80 Go From Here?" (IA Feb 82), the price of our direct connect modem is \$149, not \$199, as indicated. Your listing of add-on diskette drives for the models I and III did not include our drives for the TRS-80 Color Computer. I agree that the support services through our stores are important, but you seem to have underestimated their strength. There are over 225 Computer Centers, and over 400 stores in which we have expanded computer departments. Beyond that, products and information are available through more than 8,000 Radio Shack locations world-wide.

Martin B. Winston
Tandy/Radio Shack
Ft. Worth, TX

Terry Benson failed to mention one storage device and an alternative language in his otherwise good article. The storage device is a tape cartridge. Quantex has one, and Kennedy is coming out with one that interfaces with the TRS model III. The ability to store

INTERFACE AGE 11



SIMPLY BEAUTIFUL.

CF&A furniture looks terrific. But beauty is more than skin deep. That's why our line of desks, stands, and enclosures also features rugged construction, low cost, and quick delivery. In a wide range of sizes and configurations. With accessories to meet your individual requirements. With a smile and a thank you.

Call CF&A. We make it simple. We make it beautiful.

CF&A

**Computer Furniture and
Accessories, Inc.**
1441 West 132nd Street
Gardena, CA 90249
(213) 327-7710

CIRCLE INQUIRY NO. 22

LETTERS

large amounts of data (up to 13M bytes), removable media (most hard disks are fixed), and use inexpensive media are assets to this type of device. The drawback is the search time, which is minimized with a serpentine type format. They do require a longer access time, which has to be weighed against the advantages in each application. The language is Forth. Miller Microcomputer Services specializes in offering it for the TRS models I and III. While still on the low-end of the learning curve with Forth, I find it has certain definite advantages over the other languages.

When one is trying to solve a problem that requires large data storage and little computer power, it is interesting to note how unbalanced the TRS-80 (and other micros) are. The storage ability lags the rest of the system by far.

J.C. Halbrooks
Sterling, CT

More business systems

While your survey of "Business Systems for '82" (IA Jan 82) was excellent, your facts regarding AM Jacquard Systems were inaccurate. Jacquard was founded in the late 1960s and is generally credited with developing the first shared logic, multi function small business computer system—the J100—and bringing it to market. We have never been involved in any work on "mail room equipment and typesetting machines for the printing industry." Your confusion on this point probably stems from the fact that our parent corporation, AM International, has (or had) several divisions producing such products, i.e., AM Vartyper, AM Addressograph and AM Multigraphics. We were acquired by AM International in 1978. As part of a major divestiture program, AM put us up for sale about two months ago, along with several other divisions.

David R. Lawson
Jacquard Systems
Santa Monica, CA

The comparison tables were superb. I would like to offer a few comments.

Numerous companies have recently unveiled business systems and other products based on the 16-bit "super-chips"; only a few of those were included in the tables. Here are some others:

68000-based: Alpha Micro AM/100/L; Charles River Data Systems' Universe 68; Computhink's Eagle and Hawk; Fortune Systems; Hewlett Packard's 9826; Instrumentation Lab's Pixel 100AP; Q1 Corp.; and Wicat.

8086/8-based: Altos C8600; Artelonics 1000 and 750; Convergent Technol-

ogies IWS and AWS; IBM System/23; Intel's 86/330; Sentinel; Victor Business Systems (Sirius).

78000-based: ADDS' Mentor; Chuo Electronics/COMPAC's CEC8000; Onyx C8002; Plexus P/40; and Zilog's System 8000.

Other 16-bit microprocessor-based: TRW/Fujitsu Affinity 16; TI's DS990 and System 200.

A glaring omission in the table is the Xerox 820. Another is Computhink's Minimax, which placed third in your August issue benchmarks. Of course, the IBM Personal Computer uses an 8088, not 8086 as indicated in the tables.

Omri Serlin
ITOM International
Los Altos, CA

Reader interface

Re: the program "Word Count" (IA Aug 81) by Phil Hughes, I was delighted because it does something very useful in my work on the TRS-80 model III. In his introduction, Mr. Hughes mentioned that it would be very easy to modify it to work with any Basic. Unfortunately, I haven't yet taken a course in Basic. So I asked Radio Shack for help, but they wouldn't do it. I've tried to find friends who can help, but I'm short of the right friends—they don't seem to be able to modify the program. Would one of your readers who has done the necessary modification for the TRS-80 (using Scripsit) be willing to send me the revised program?

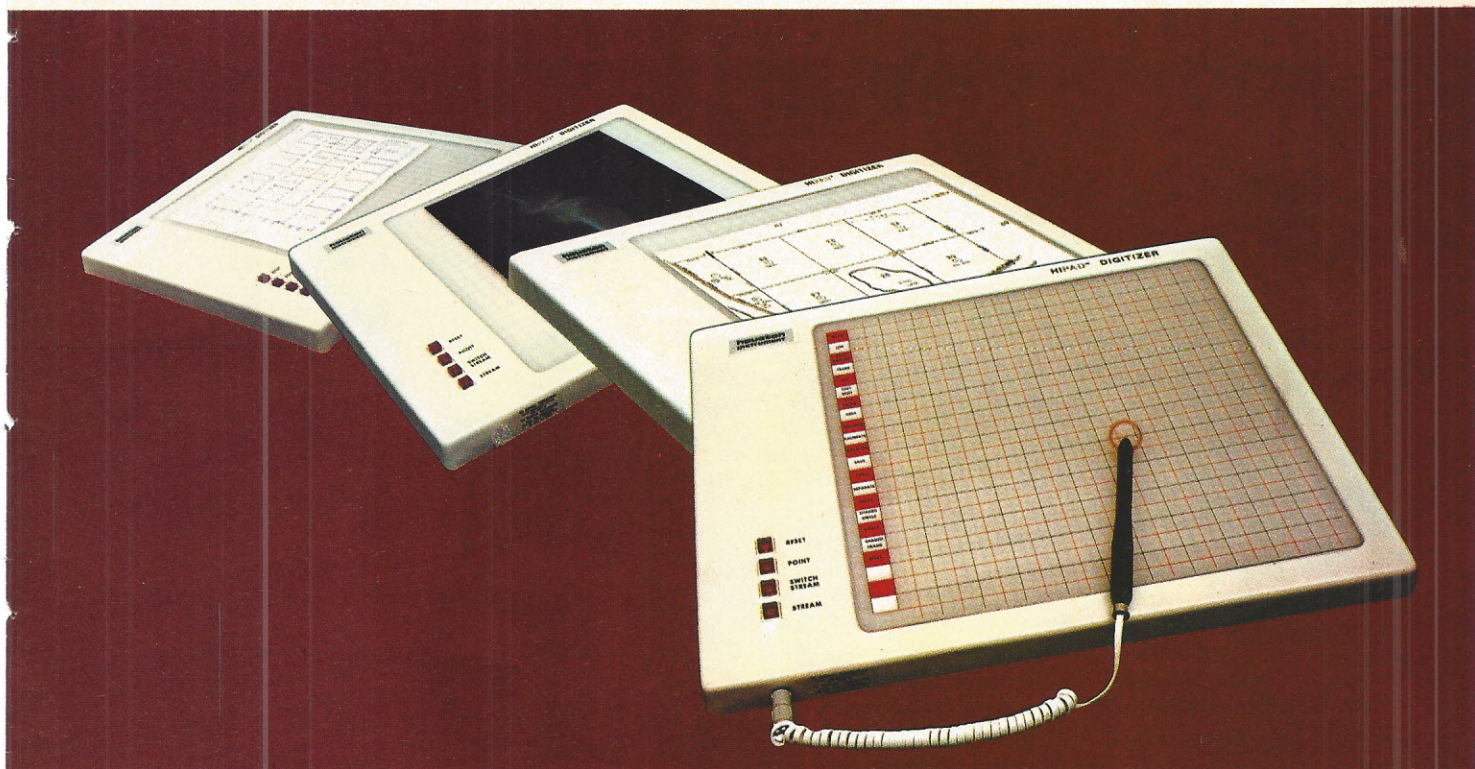
Isai Kamen
11 Sherman Ave.
White Plains, NY 10605

I am in the process of developing a data base for the software and hardware availability for the IBM Personal Computer system. I plan to publish two monthly listings: one would list the new additions and the other will list all the software and hardware available to that date. The listings would have two parts: one will cover the available hardware and the other will cover the software available in all the areas. The list will be indexed by the title and source. Classification of the product, name, description, configuration required, available form, price, source from where it could be obtained, and other necessary information will be included in the listings. Interested parties developing hardware or software should write as soon as possible to include their products in the list. Persons looking for available hardware and software should also write for information.

Dr. Kailash Chandra
Box 748
Quincy, IL 62301

In this age of runaway inflation...

Look what \$825* will buy



The HIPAD™ digitizer

Inexpensive input to your computer

The HIPAD™ digitizer can be used for both converting graphic information into digital values and as a menu. Utilizing either the stylus or the optional cursor, the operator can input graphic data into the computer by locating individual points on the digitizers 11" x 11" (28cm x 28cm) active area. In the "stream mode" a continuance of placements of coordinate pairs may be input.

Not a kit, the HIPAD™ comes complete with both RS-232-C and parallel interfaces and has its own built-in power source. The origin is completely relocatable so coordinates may be positive or minus for a true reference value and oversized material may be input by simply resetting the origin.

Accurate positional information, free form sketches, even keyboard simulation

All can be entered using the multi-faceted HIPAD™ digitizer. Its capabilities and low price make the UL listed HIPAD™ a natural selection over keyboard entry, inaccurate joysticks, or expensive approximating light pens. It's perfect for inputting isometric drawings, schematics, X-rays, architectural drawings, business graphs, and many other forms of graphic information, as well as creating your own graphics.

Use it with Apple II™, TRS-80 Level II™, PET™ or other popular computers

The HIPAD's™ built-in RS-232C and parallel 8 bit interfaces make it all possible. (For Apple II order DT-11A, for TRS-80 or PET order DT-11). Furthermore, you get English or metric scaling, data format (Binary/BCD/ASCII), selectable baud rates, and resolution of either .005" or .01".

For complete information, contact Houston, Instrument, P.O. Box 15720, Austin, Texas 78761. (512) 835-0900. For rush literature requests, outside Texas call toll free 1-800-531-5205. For technical information ask for operator #5. In Europe contact Houston Instrument, Rochesterlaan 6, 8240 Gistel, Belgium. Phone 059/27-74-45. Telex Bausch 81399.

INSTRUMENTS & SYSTEMS DIVISION
Together...we'll create tomorrow.

TM HIPAD is a trademark of Houston Instrument
TRS-80 is a trademark of Tandy Corporation
APPLE is a trademark of Apple Computer, Inc.
PET is a trademark of Commodore Business Machines, Inc.

CIRCLE INQUIRY NO. 11 FOR LITERATURE
CIRCLE INQUIRY NO. 12 FOR LITERATURE & REP. CONTACT

BAUSCH & LOMB



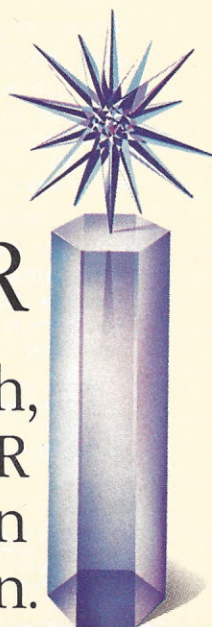
The ideal input device for the small system user.

8011-1	\$65.00	8017-10	\$245.00	8019-10	\$245.00	8021-10	\$245.00	8023-10	\$245.00
8012-1	\$65.00	8018-10	\$245.00	8020-10	\$245.00	8022-10	\$245.00	8024-10	\$245.00
8013-1	\$65.00	8019-10	\$245.00	8021-10	\$245.00	8023-10	\$245.00	8025-10	\$245.00
8014-1	\$65.00	8020-10	\$245.00	8022-10	\$245.00	8024-10	\$245.00	8026-10	\$245.00
8015-1	\$65.00	8021-10	\$245.00	8023-10	\$245.00	8025-10	\$245.00	8027-10	\$245.00
8016-1	\$65.00	8022-10	\$245.00	8024-10	\$245.00	8026-10	\$245.00	8028-10	\$245.00
8017-1	\$65.00	8023-10	\$245.00	8025-10	\$245.00	8027-10	\$245.00	8029-10	\$245.00
8018-1	\$65.00	8024-10	\$245.00	8026-10	\$245.00	8028-10	\$245.00	8030-10	\$245.00
8019-1	\$65.00	8025-10	\$245.00	8027-10	\$245.00	8029-10	\$245.00	8031-10	\$245.00
8020-1	\$65.00	8026-10	\$245.00	8028-10	\$245.00	8030-10	\$245.00	8032-10	\$245.00
8021-1	\$65.00	8027-10	\$245.00	8029-10	\$245.00	8031-10	\$245.00	8033-10	\$245.00
8022-1	\$65.00	8028-10	\$245.00	8030-10	\$245.00	8032-10	\$245.00	8034-10	\$245.00
8023-1	\$65.00	8029-10	\$245.00	8031-10	\$245.00	8033-10	\$245.00	8035-10	\$245.00
8024-1	\$65.00	8030-10	\$245.00	8032-10	\$245.00	8034-10	\$245.00	8036-10	\$245.00
8025-1	\$65.00	8031-10	\$245.00	8033-10	\$245.00	8035-10	\$245.00	8037-10	\$245.00
8026-1	\$65.00	8032-10	\$245.00	8034-10	\$245.00	8036-10	\$245.00	8038-10	\$245.00
8027-1	\$65.00	8033-10	\$245.00	8035-10	\$245.00	8037-10	\$245.00	8039-10	\$245.00
8028-1	\$65.00	8034-10	\$245.00	8036-10	\$245.00	8038-10	\$245.00	8040-10	\$245.00
8029-1	\$65.00	8035-10	\$245.00	8037-10	\$245.00	8039-10	\$245.00	8041-10	\$245.00
8030-1	\$65.00	8036-10	\$245.00	8038-10	\$245.00	8040-10	\$245.00	8042-10	\$245.00
8031-1	\$65.00	8037-10	\$245.00	8039-10	\$245.00	8041-10	\$245.00	8043-10	\$245.00
8032-1	\$65.00	8038-10	\$245.00	8040-10	\$245.00	8042-10	\$245.00	8044-10	\$245.00
8033-1	\$65.00	8039-10	\$245.00	8041-10	\$245.00	8043-10	\$245.00	8045-10	\$245.00
8034-1	\$65.00	8040-10	\$245.00	8042-10	\$245.00	8044-10	\$245.00	8046-10	\$245.00
8035-1	\$65.00	8041-10	\$245.00	8043-10	\$245.00	8045-10	\$245.00	8047-10	\$245.00
8036-1	\$65.00	8042-10	\$245.00	8044-10	\$245.00	8046-10	\$245.00	8048-10	\$245.00
8037-1	\$65.00	8043-10	\$245.00	8045-10	\$245.00	8047-10	\$245.00	8049-10	\$245.00
8038-1	\$65.00	8044-10	\$245.00	8046-10	\$245.00	8048-10	\$245.00	8050-10	\$245.00
8039-1	\$65.00	8045-10	\$245.00	8047-10	\$245.00	8049-10	\$245.00	8051-10	\$245.00
8040-1	\$65.00	8046-10	\$245.00	8048-10	\$245.00	8050-10	\$245.00	8052-10	\$245.00
8041-1	\$65.00	8047-10	\$245.00	8049-10	\$245.00	8051-10	\$245.00	8053-10	\$245.00
8042-1	\$65.00	8048-10	\$245.00	8050-10	\$245.00	8052-10	\$245.00	8054-10	\$245.00
8043-1	\$65.00	8049-10	\$245.00	8051-10	\$245.00	8053-10	\$245.00	8055-10	\$245.00
8044-1	\$65.00	8050-10	\$245.00	8052-10	\$245.00	8054-10	\$245.00	8056-10	\$245.00
8045-1	\$65.00	8051-10	\$245.00	8053-10	\$245.00	8055-10	\$245.00	8057-10	\$245.00
8046-1	\$65.00	8052-10	\$245.00	8054-10	\$245.00	8056-10	\$245.00	8058-10	\$245.00
8047-1	\$65.00	8053-10	\$245.00	8055-10	\$245.00	8057-10	\$245.00	8059-10	\$245.00
8048-1	\$65.00	8054-10	\$245.00	8056-10	\$245.00	8058-10	\$245.00	8060-10	\$245.00
8049-1	\$65.00	8055-10	\$245.00	8057-10	\$245.00	8059-10	\$245.00	8061-10	\$245.00
8050-1	\$65.00	8056-10	\$245.00	8058-10	\$245.00	8060-10	\$245.00	8062-10	\$245.00
8051-1	\$65.00	8057-10	\$245.00	8059-10	\$245.00	8061-10	\$245.00	8063-10	\$245.00
8052-1	\$65.00	8058-10	\$245.00	8060-10	\$245.00	8062-10	\$245.00	8064-10	\$245.00
8053-1	\$65.00	8059-10	\$245.00	8061-10	\$245.00	8063-10	\$245.00	8065-10	\$245.00
8054-1	\$65.00	8060-10	\$245.00	8062-10	\$245.00	8064-10	\$245.00	8066-10	\$245.00
8055-1	\$65.00	8061-10	\$245.00	8063-10	\$245.00	8065-10	\$245.00	8067-10	\$245.00
8056-1	\$65.00	8062-10	\$245.00	8064-10	\$245.00	8066-10	\$245.00	8068-10	\$245.00
8057-1	\$65.00	8063-10	\$245.00	8065-10	\$245.00	8067-10	\$245.00	8069-10	\$245.00
8058-1	\$65.00	8064-10	\$245.00	8066-10	\$245.00	8068-10	\$245.00	8070-10	\$245.00
8059-1	\$65.00	8065-10	\$245.00	8067-10	\$245.00	8069-10	\$245.00	8071-10	\$245.00
8060-1	\$65.00	8066-10	\$245.00	8068-10	\$245.00	8070-10	\$245.00	8072-10	\$245.00
8061-1	\$65.00	8067-10	\$245.00	8069-10	\$245.00	8071-10	\$245.00	8073-10	\$245.00
8062-1	\$65.00	8068-10	\$245.00	8070-10	\$245.00	8072-10	\$245.00	8074-10	\$245.00
8063-1	\$65.00	8069-10	\$245.00	8071-10	\$245.00	8073-10	\$245.00	8075-10	\$245.00
8064-1	\$65.00	8070-10	\$245.00	8072-10	\$245.00	8074-10	\$245.00	8076-10	\$245.00
8065-1	\$65.00	8071-10	\$245.00	8073-10	\$245.00	8075-10	\$245.00	8077-10	\$245.00
8066-1	\$65.00	8072-10	\$245.00	8074-10	\$245.00	8076-10	\$245.00	8078-10	\$245.00
8067-1	\$65.00	8073-10	\$245.00	8075-10	\$245.00	8077-10	\$245.00	8079-10	\$245.00
8068-1	\$65.00	8074-10	\$245.00	8076-10	\$245.00	8078-10	\$245.00	8080-10	\$245.00
8069-1	\$65.00	8075-10	\$245.00	8077-10	\$245.00	8079-10	\$245.00	8081-10	\$245.00
8070-1	\$65.00	8076-10	\$245.00	8078-10	\$245.00	8080-10	\$245.00	8082-10	\$245.00
8071-1	\$65.00	8077-10	\$245.00	8079-10	\$245.00	8081-10	\$245.00	8083-10	\$245.00
8072-1	\$65.00	8078-10	\$245.00	8080-10	\$245.00	8082-10	\$245.00	8084-10	\$245.00
8073-1	\$65.00	8079-10	\$245.00	8081-10	\$245.00	8083-10	\$245.00	8085-10	\$245.00
8074-1	\$65.00	8080-10	\$245.00	8082-10	\$245.00	8084-10	\$245.00	8086-10	\$245.00
8075-1	\$65.00	8081-10	\$245.00	8083-10	\$245.00	8085-10	\$245.00	8087-10	\$245.00
8076-1	\$65.00	8082-10	\$245.00	8084-10	\$245.00	8086-10	\$245.00	8088-10	\$245.00
8077-1	\$65.00	8083-10	\$245.00	8085-10	\$245.00	8087-10	\$245.00	8089-10	\$245.00
8078-1	\$65.00	8084-10	\$245.00	8086-10	\$245.00	8088-10	\$245.00	8090-10	\$245.00
8079-1	\$65.00	8085-10	\$245.00	8087-10	\$245.00	8089-10	\$245.00	8091-10	\$245.00
8080-1	\$65.00	8086-10	\$245.00	8088-10	\$245.00	8090-10	\$245.00	8092-10	\$245.00
8081-1	\$65.00	8087-10	\$245.00	8089-10	\$245.00	8091-10	\$245.00	8093-10	\$245.00
8082-1	\$65.00	8088-10	\$245.00	8090-10	\$245.00	8092-10	\$245.00	8094-10	\$245.00
8083-1	\$65.00	8089-10	\$245.00	8091-10	\$245.00	8093-10	\$245.00	8095-10	\$245.00
8084-1	\$65.00	8090-10	\$245.00	8092-10	\$245.00	8094-10	\$245.00	8096-10	\$245.00
8085-1	\$65.00	8091-10	\$245.00	8093-10	\$245.00	8095-10	\$245.00	8097-10	\$245.00
8086-1	\$65.00	8092-10	\$245.00	8094-10	\$245.00	8096-10	\$245.00	8098-10	\$245.00
8087-1	\$65.00	8093-10	\$245.00	8095-10	\$245.00	8097-10	\$245.00	8099-10	\$245.00
8088-1	\$65.00	8094-10	\$245.00	8096-10	\$245.00	8098-10	\$245.00	8100-10	\$245.00
8089-1	\$65.00	8095-10	\$245.00	8097-10	\$245.00	8099-10	\$245.00	8101-10	\$245.00
8090-1	\$65.00	8096-10	\$245.00	8098-10	\$245.00	8100-10	\$245.00	8102-10	\$245.00
8091-1	\$65.00	8097-10	\$245.00	8099-10	\$245.00	8101-10	\$245.00	8103-10	\$245.00
8092-1	\$65.00	8098-10	\$245.00	8100-10	\$245.00	8102-10	\$245.00	8104-10	\$245.00
8093-1	\$65.00	8099-10	\$245.00	8101-10	\$245.00	8103-10	\$245.00	8105-10	\$245.00
8094-1	\$65.00	8100-10	\$245.00	8102-10	\$245.00	8104-10	\$245.00	8106-10	\$245.00
8095-1	\$65.00	8101-10	\$245.00	8103-10	\$245.00	8105-10	\$245.00	8107-10	\$245.00
8096-1	\$65.00	8102-10	\$245.00	8104-10	\$245.00	8106-10	\$245.00	8108-10	\$245.00
8097-1	\$65.00	8103-10	\$245.00	8105-10	\$245.00	8107-10	\$245.00	8109-10	\$245.00
8098-1	\$65.00	8104-10	\$245.00	8106-10	\$245.00	8108-10	\$245.00	8110-10	\$245.00
8099-1	\$65.00	8105-10	\$245.00	8107-10	\$245.00	8109-10	\$245.00	8111-10	\$245.00
8100-1	\$65.00	8106-10	\$245.00	8108-10	\$245.00	8110-10	\$245.00	8112-10	\$245.00
8101-1	\$65.00	8107-10	\$245.00	8109-10	\$245.00	8111-10	\$245.00	8113-10	\$245.00
8102-1	\$65.00	8108-10	\$245.00	8110-10	\$245.00	8112-10	\$245.00	8114-10	\$245.00
8103-1	\$65.00	8109-10	\$245.00	8111-10	\$245.00	8113-10	\$245.00	8115-10	\$245.00
8104-1	\$65.00	8110-10	\$245.00	8112-10	\$245.00	8114-10	\$245.00	8116-10	\$245.00
8105-1	\$65.00	8111-10	\$245.00	8113-10	\$245.00	8115-10	\$245.00	8117-10	\$245.00
8106-1	\$65.00	8112-10	\$245.00	8114-10	\$245.00	8116-10	\$245.00	8118-10	\$245.00
8107-1	\$65.00	8113-10	\$245.00	8115-10	\$245.00	8117-10	\$245.00	8119-10	\$245.00
8108-1	\$65.00	8114-10	\$245.00	8116-10	\$245.00	8118-10	\$245.00	8120-10	\$245.00
8109-1	\$65.00	8115-10	\$245.00	8117-10	\$245.00	8119-10	\$245.00	8121-10	\$245.00
8110-1	\$65.00	8116-10	\$245.00	8118-10	\$245.00	8120-10	\$245.00	8122-10	\$245.00
8111-1	\$65.00	8117-10	\$245.00	8119-10	\$245.00	8121-10	\$245.00	8123-10	\$245.00
8112-1	\$65.00	8118-10	\$245.00	8120-10	\$245.00	8122-10	\$245.00	8124-10	\$245.00
8113-1	\$65.00	8119-10	\$245.00	8121-10	\$245.00	8123-10	\$245.00	8125-10	\$245.00
8114-1	\$65.00	8120-10	\$245.00	8122-10	\$245.00	8124-10	\$245.00	8126-10	\$245.00
8115-1	\$65.00	8121-10	\$245.00	8123-10	\$245.00	8125-10	\$245.00	8127-10	\$245.00
8116-1	\$65.00	8122-10	\$245.00	8124-10	\$245.00	8126-10	\$245.00	812	

Introducing the premier award of the software industry.

THE ATARI® STAR

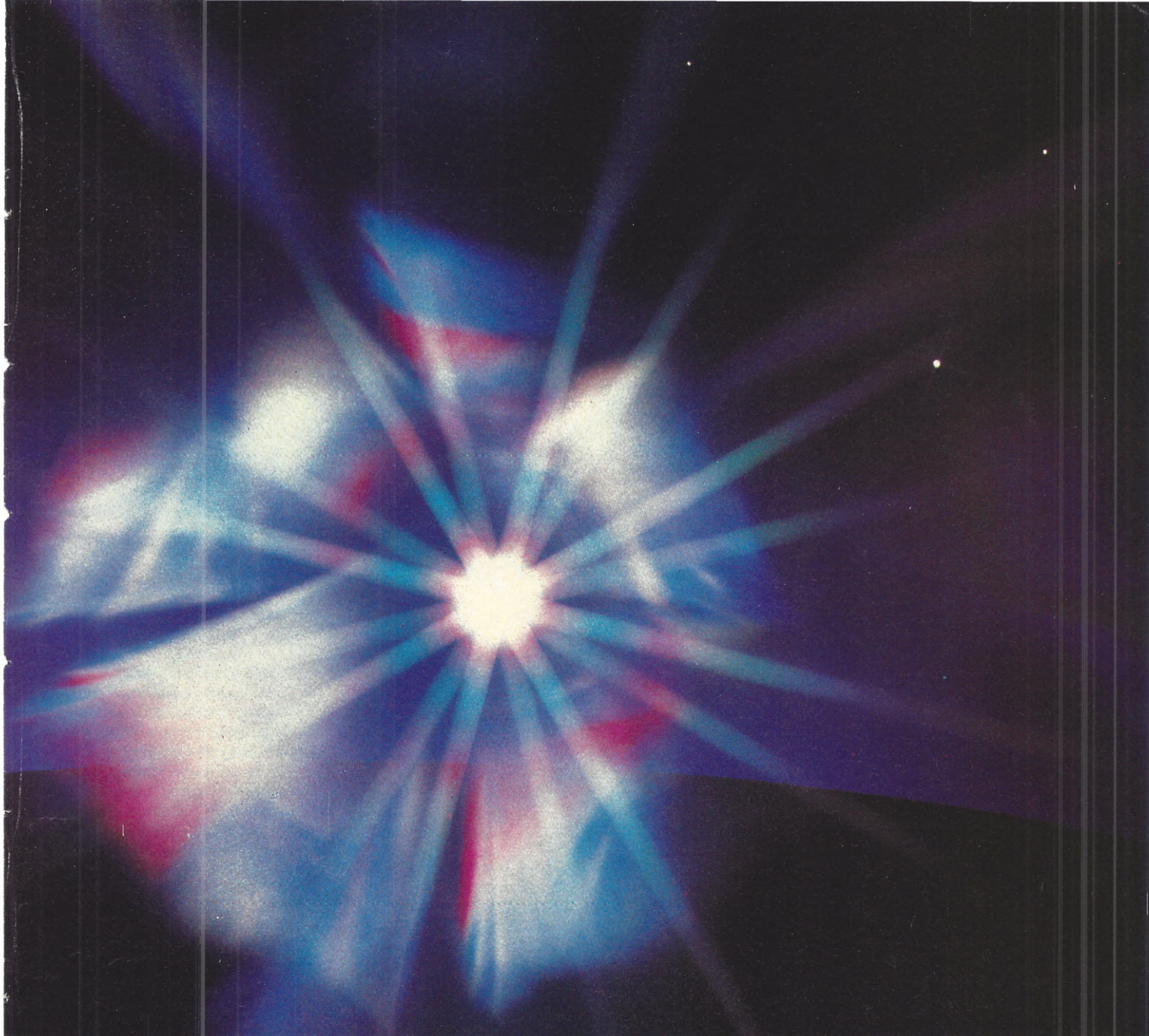
Win \$25,000 in cash,
plus prizes and an ATARI STAR
by entering your software in
the ATARI® ASAP competition.



ATARI is looking for some of the greatest software from the brightest stars in the software field. And naturally, we're willing to reward you for it.

Every three months, ATARI will be presenting ATARI STARS to the writers of software programs judged first, second and third place in the following categories: consumer (including entertainment, personal interest and development); education; home business (personal finance and record keeping); and system software. The decision of the ATARI judges is final.

Quarterly prizes will be from \$750 to \$3,000 worth* of selected



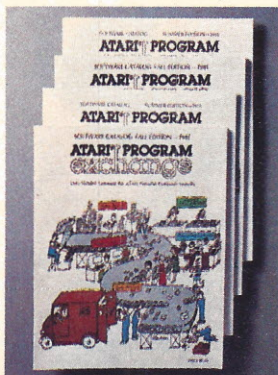
ATARI products and an ATARI STAR. The annual Grand Prize will be the coveted Super Star trophy and \$25,000 in cash.**

To be eligible, your software idea must be submitted to and published in the ATARI Program Exchange catalog. Submit your program on the official entry form which we'll rush to you if you send in the attached coupon.

The ATARI STAR Awards are in addition to the percentage of revenues you will automatically be entitled to as

a result of sales of your software programs in the ATARI Program Exchange.

If you're a star, ATARI wants to reward you. Send in the coupon today, or call toll-free 800-538-1862, in California 800-672-1850, and you could be the proud winner of an ATARI ASAP STAR Trophy, and some great ATARI prizes.



*Based on manufacturer's suggested retail price.

**Taxes are the sole responsibility of the winner. Void where prohibited by law. Winners will be notified by mail. ATARI employees and their families are not eligible. For more contest details, call the toll-free numbers. © 1981 ATARI, INC.

For more contest details, call 800-538-1862, in California 800-672-1850.

Send to: ATARI Software Acquisition Program, Dept. C22E, P.O. Box 427, Sunnyvale, CA 94086

Yes, I want to enter the ATARI ASAP competition. Please rush me my entry form.

Name _____

Address _____

City _____

State/Zip _____



A Warner Communications Company

*We've Brought
The Computer Age Home.™*

The \$149⁹⁵ personal computer.

Introducing the Sinclair ZX81

If you're ever going to buy a personal computer, now is the time to do it.

The new Sinclair ZX81 is the most powerful, yet easy-to-use computer ever offered for anywhere near the price: only \$149.95* completely assembled.

Don't let the price fool you. The ZX81 has just about everything you could ask for in a personal computer.

A breakthrough in personal computers

The ZX81 is a major advance over the original Sinclair ZX80—the world's largest selling personal computer and the first for under \$200.

In fact, the ZX81's new 8K Extended BASIC offers features found only on computers costing two or three times as much.

Just look at what you get:

- Continuous display, including moving graphics
- Multi-dimensional string and numerical arrays

*Plus shipping and handling. Price includes connectors for TV and cassette, AC adaptor, and FREE manual.

- Mathematical and scientific functions accurate to 8 decimal places
- Unique one-touch entry of key words like PRINT, RUN and LIST
- Automatic syntax error detection and easy editing
- Randomize function useful for both games and serious applications
- Built-in interface for ZX Printer
- 1K of memory expandable to 16K

The ZX81 is also very convenient to use. It hooks up to any television set to produce a clear 32-column by 24-line display. And you can use a regular cassette recorder to store and recall programs by name.

If you already own a ZX80

The 8K Extended BASIC chip used in the ZX81 is available as a plug-in replacement for your ZX80 for only \$39.95, plus shipping and handling—complete with new keyboard overlay and the ZX81 manual.

So in just a few minutes, with no special skills or tools required, you can upgrade your ZX80 to have all the powerful features of the ZX81. (You'll have everything except continuous display, but you can still use the PAUSE and SCROLL commands to get moving graphics.)

With the 8K BASIC chip, your ZX80 will also be equipped to use the ZX Printer and Sinclair software.

Order at no risk**

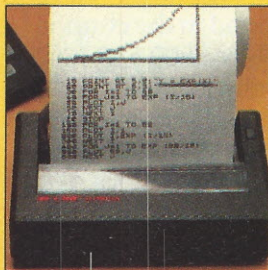
We'll give you 10 days to try out the ZX81. If you're not completely satisfied, just return it to Sinclair Research and we'll give you a full refund.

And if you have a problem with your ZX81, send it to Sinclair Research within 90 days and we'll repair or replace it at no charge.

**Does not apply to ZX81 kits.



NEW SOFTWARE: Sinclair has published pre-recorded programs on cassettes for your ZX81, or ZX80 with 8K BASIC. We're constantly coming out with new programs, so we'll send you our latest software catalog with your computer.



ZX PRINTER: The Sinclair ZX Printer will work with your ZX81, or ZX80 with 8K BASIC. It will be available in the near future and will cost less than \$100.



16K MEMORY MODULE: Like any powerful, full fledged computer, the ZX81 is expandable. Sinclair's 16K memory module plugs right onto the back of your ZX81 (or ZX80, with or without 8K BASIC). Cost is \$99.95, plus shipping and handling.



ZX81 MANUAL: The ZX81 comes with a comprehensive 164-page programming guide and operating manual designed for both beginners and experienced computer users. A \$10.95 value, it's yours free with the ZX81.

The \$99⁹⁵ personal computer.

Introducing the ZX81 kit

If you really want to save money, and you enjoy building electronic kits, you can order the ZX81 in kit form for the incredible price of just \$99.95*. It's the same, full-featured computer, only you put it together yourself. We'll send complete, easy-to-follow instructions on how you can assemble your ZX81 in just a few hours. All you have to supply is the soldering iron.

How to order

Sinclair Research is the world's largest manufacturer of personal computers.

The ZX81 represents the latest technology in microelectronics, and it picks up right where the ZX80 left off. Thousands are selling every week.

We urge you to place your order for the new ZX81 today. The sooner you order, the sooner you can start enjoying your own computer.

To order, simply call our toll free number, and use your MasterCard or VISA.

To order by mail, please use the coupon. And send your check or money order. We regret that we cannot accept purchase orders or C.O.D.'s.

CALL 800-543-3000. Ask for operator #509. In Ohio call 800-582-1364. In Canada call 513-729-4300. Ask for operator #509. Phones open 24 hours a day, 7 days a week. Have your MasterCard or VISA ready.

These numbers are for orders only. For information, you must write to Sinclair Research Ltd., 2 Sinclair Plaza, Nashua, NH 03061.

sinclair

AD CODE 041A

PRICE† QTY. AMOUNT

ZX81 \$149.95

ZX81 Kit 99.95

8K BASIC chip (for ZX80) 39.95

16K Memory Module (for ZX81 or ZX80) 99.95

Shipping and Handling 4.95

\$4.95

TOTAL

MAIL TO: Sinclair Research Ltd., One Sinclair Plaza, Nashua, NH 03061.

NAME

ADDRESS

CITY/STATE/ZIP

†U.S. Dollars

Film discusses importance of personal computers

One Pass Productions and CRM/McGraw-Hill have collaborated on a documentary feature on personal computing. *Don't Bother Me, I'm Learning* has completed principal photography. One Pass is producing this documentary feature for television broadcast and



CRM/McGraw-Hill will handle non-broadcast distribution. The explosive growth of personal computers in the community is the focus of the production. Locations include a computer camp for kids, Computer Town U.S.A., a boy's computer club and a laboratory for dolphins.

People of all ages explain and demonstrate how personal computers are

improving the quality of their lives. Viewers see children and adults who are pioneers of this computer revolution. Their everyday uses of computer technology are blueprints for future applications.

According to spokespeople from One Pass, the program will underscore the fact that computer literacy is being recognized as a basic lifeskill for the 80s, because of the increasing frequency of people/computer interface in everyday life.

Employer requests for data processors up sharply during 1981

Employer requests for computer personnel during 1981 were up 23% over 1980, reports Robert Half International, a data processing recruiter.

The organization attributed the sharp rise in demand for data processors to three major factors. In this period of severe inflation, high-interest rates and growing competitive pressures, businesses must generate, retrieve and analyze more information more quickly than ever before. Secondly, the new inexpensive mini- and microcomputers

are enabling smaller firms to realize the benefits of on-premises data processing facilities for the first time. Finally, additional data processors are needed to maintain and upgrade existing systems, to operate new, more sophisticated hardware.

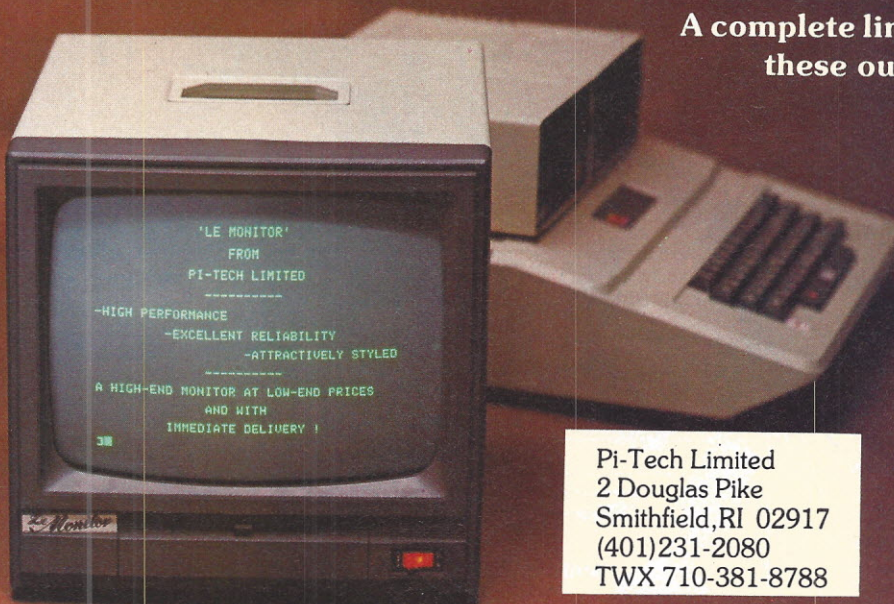
Robert Half, head of the company, said that he expected nationwide demand for computer professionals to remain "exceptionally strong" in the foreseeable future.

News teletext magazine off and running in Chicago

Nite-Owl, a news and information teletext magazine, recently premiered on a local Chicago, IL, television channel. The program is broadcast seven nights a week, midnight to 6:00 a.m.—providing the only continually updated television news package in the Chicago area in this time slot.

Viewers see rolling pages of text and computer-produced graphics of the latest international, national and local news, sports, weather, travel, entertainment, and financial information, plus advertising messages.

Compare our price and performance. Le Monitor is second to none!



A complete line of monitors with these outstanding features.

- 9" and 12" models
- Green or white phosphorous
- 80 x 24 character display
- High resolution-800 lines, non-glare CRT
- 1 year warranty!

Pi-Tech Limited
2 Douglas Pike
Smithfield, RI 02917
(401)231-2080
TWX 710-381-8788

**Dealer Inquiries
Invited**

Micro Craft, Inc.

ANNOUNCES

BILLKEEPER

★
ACCOUNTANTS

★
ADVERTISING
AGENCIES

★
ARCHITECTS

★
CHIROPRACTORS

★
CIVIL ENGINEERS

★
CONSULTING
ENGINEERS

★
DETECTIVES

★
EDITORS

★
EDUCATIONAL
CONSULTANTS

★
MANAGEMENT
CONSULTANTS

★
PSYCHIATRISTS

★
PSYCHOLOGISTS

★
SOFTWARE
CONSULTANTS

★
STRUCTURAL
ENGINEERS

AND
MANY
OTHERS

★ ITEMIZED BILLS
READY TO MAIL

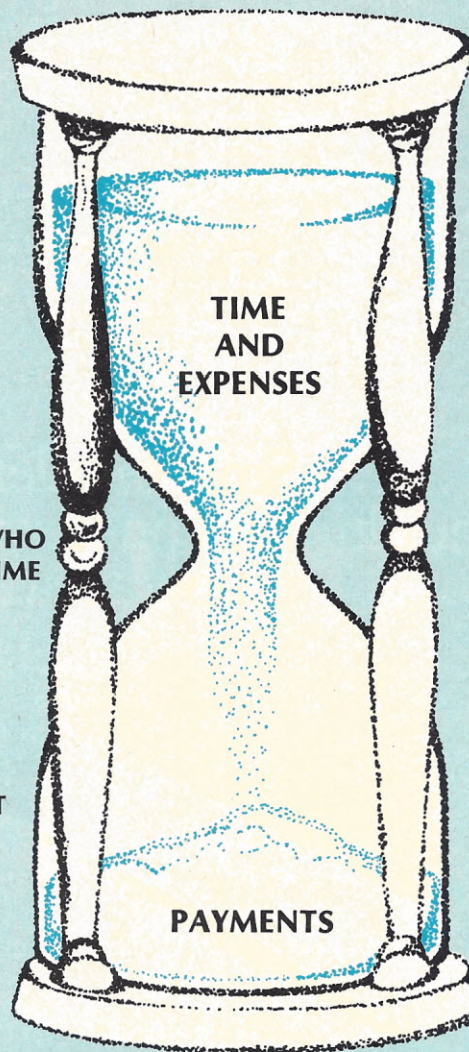
★ FOR ALL
PROFESSIONALS WHO
BILL FOR THEIR TIME

★ ALL TYPES OF
BILLS — STRAIGHT
TIME, FLAT FEE
AND 5 MORE

★ MONTHLY FINANCIAL
AND TIMEKEEPING
SUMMARIES

★ SIMPLE TO USE —
NO TRAINING
REQUIRED

★ FOR CP/M®
CBASIC 2™ SYSTEMS
WITH 2 DISK
DRIVES



We created Legal Billing and Timekeeping for lawyers. Now we have BillKeeper for all other professionals who need comprehensive bills showing itemized services, expenses and payments.

Manual \$40

Manual & 8" Demo Disk \$75

(also available — 5¼" Apple & Superbrain formats)

**MICRO
CRAFT
INC.**

2007 WHITESBURG DRIVE • SUITE F
HUNTSVILLE, AL 35801 • (205) 883-1817

CP/M is trademark of Digital Research
CBASIC 2 is a trademark of Compiler Systems

At Hayes, we don't believe in second best. Or planned obsolescence. We believe in taking the state of the art to the limit. Our new Smartmodem, for example, is the most sophisticated 300-baud originate/answer modem you can buy. And yet, it is perhaps the easiest-to-use modem ever.

RS-232C Compatible. Smartmodem lets any RS-232C compatible computer or terminal communicate by phone with other computers and time-sharing systems located *anywhere in North America*. You get full and half-duplex operation with both Touch-Tone* and pulse dialing.

Auto-Answer/Dial/Repeat. Smartmodem can answer the phone, dial a number, receive and transmit data, and then hang up the phone—automatically! If desired, Smartmodem will even repeat the last command. You can depend on Smartmodem for completely unattended operation.

Completely Programmable. Smartmodem can be controlled using

Hayes Stack™

Microcomputer Component Systems

any programming language. Over 30 different commands can be written into your programs or entered directly from your keyboard.

Smartmodem also includes several switch-selectable features that let you tailor performance to your exact needs. You can "set it and forget it" for the ultimate in convenience.

Built-in Audio Monitor. Thanks to an internal speaker, you can actually listen to your connection being made. You'll know immediately if the line is busy or if you reached a wrong number—

and you don't even need a phone!

Status at a Glance. Seven LED's indicate Smartmodem's current operating mode: auto-answer, carrier detect, off hook, receive data, send data, terminal ready and modem ready. You're never left in the dark!

Direct-Connect Design.

Smartmodem is FCC registered for direct connection to any modular phone jack—there's no acoustic coupler to cause signal loss and distortion.

Smartmodem, Smart Buy. Professional quality features. Versatile performance. A full two-year limited warranty. A suggested retail price of only \$279.

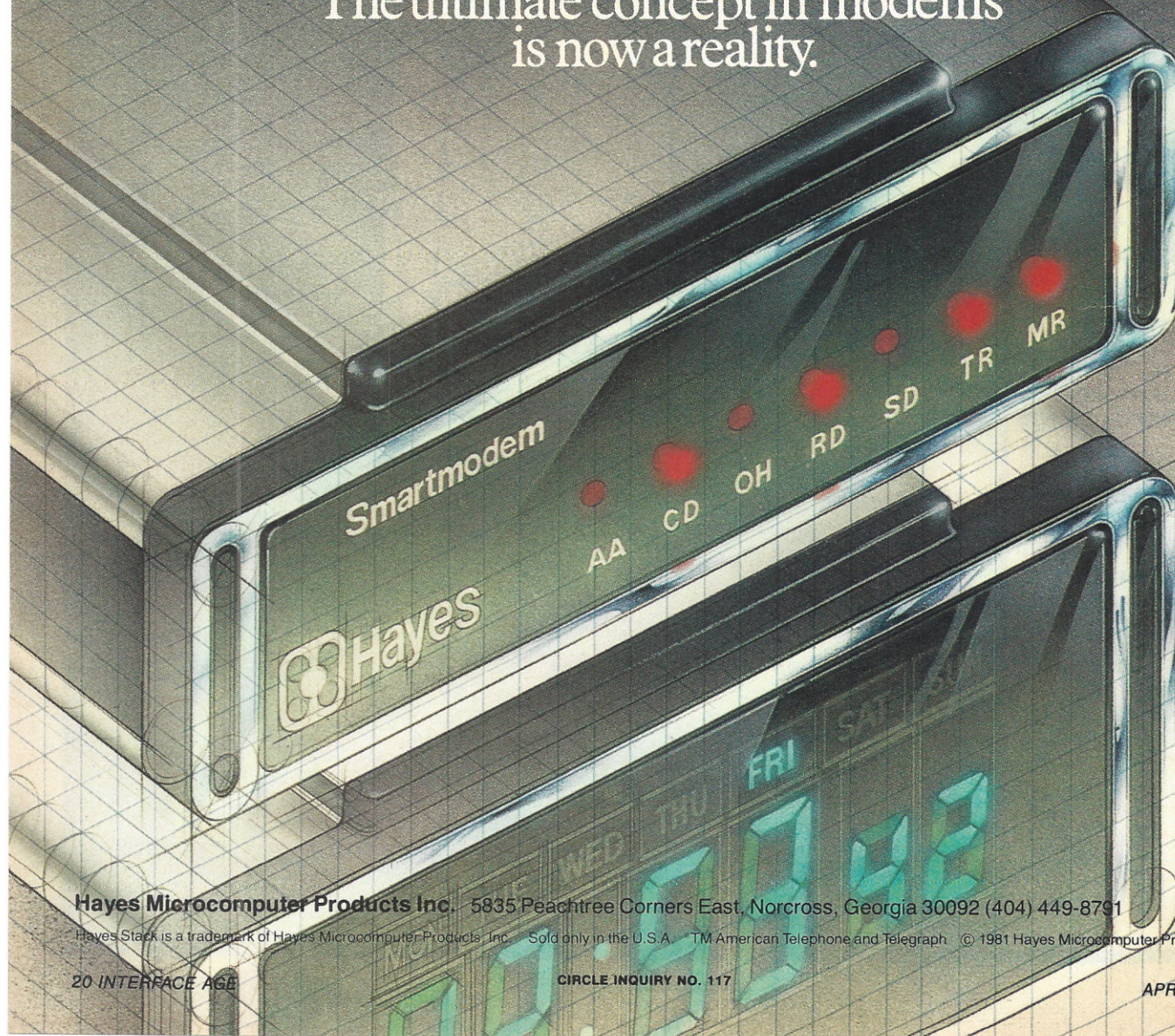
What more could you want? Perhaps the matching Hayes Stack Chronograph, an RS-232C compatible calendar/clock system.

Check out the Smartmodem wherever fine computer products are sold.

And don't settle for anything less than Hayes.



Smartmodem.
The ultimate concept in modems
is now a reality.



Hayes Microcomputer Products Inc. 5835 Peachtree Corners East, Norcross, Georgia 30092 (404) 449-8751

Hayes Stack is a trademark of Hayes Microcomputer Products, Inc. Sold only in the U.S.A. TM American Telephone and Telegraph © 1981 Hayes Microcomputer Products, Inc.

The 20-minute news orbits are updated throughout the night by specially trained teletext journalists who utilize Nite-Owl's flexibility and speed to include new information on developing stories and report late-breaking news.

The show is produced by Field Electronic Publishing of Chicago. Since last April, FEP has been broadcasting Keyfax, a demand teletext system that allows users to select information through a hand-held keypad. Keyfax is carried on an unused portion of the Channel 32 signal to decoder-equipped television sets in Chicago area high-traffic public places and private homes.

Keyfax was the first commercial teletext experiment approved by the Federal Communications Commission.

The data base for Keyfax and Nite-Owl includes information supplied by the Associated Press, United Press International, Dow Jones, the Chicago City News Bureau, the Chicago Sun-Times and the Chicago Public Library.

Bookstores take aggressive approach in specialty retailing with POS

the Waldenbooks nationwide bookstore chain recently completed installing point-of-sale (POS) terminals in its more than 700 retail stores.

The complexity of the move to computerized selling is underscored by the fact that the average Waldenbooks store offers more than 20,000 different books (with frequently triple that number of volumes in stock) in approximately 3,200 square feet of selling space. The company prepared its own software packages to handle its very specific requirements, basing the system on the IBM 3680 programmable POS system.

The resulting installation is one in which individual stores now "talk" automatically each night with the company's IBM 3033 computer in Anaheim, CA, giving sales figures, titles sold, merchandise orders and other data. The information is transmitted to Waldenbooks' Stamford, CT, headquarters, where it is compiled into reports that are sent to each store weekly.

These reports help store managers maintain stock levels of both new releases and steady-selling or backlist books, expand high interest sections and evaluate various display and merchandising techniques. Managers are thus able to do their jobs more effectively with less time-consuming routine work.

When Harry Hoffman became president of the Waldenbooks division of Carter Hawley Hale Stores in 1979, the company's POS capabilities encompassed only 70 stores. The remaining

500 had mechanical cash registers without information collection capabilities.

"I felt very strongly that to build both profit and service levels, we needed more up-to-date information on what was selling, what was in stock and what should be reordered. Only a full-scale, computer-based system could give us the tools required to make sound marketing decisions," Hoffman said.

By emphasizing the data processing requirements of Waldenbooks, Hoffman, in effect, defined a goal for the management information systems department to develop a completely new system that would handle current business requirements, yet could be adaptable to more complex functions in the future.

Learning center on electronic products opens in Chicago

A learning center to provide information and education on the use of electronic products in home and business recently opened in Chicago, IL. Targeted at the business and professional community as well as the home market, the center will help end users understand, select and apply the wide range of computing products now available to help solve business problems, increase productivity and bring computing power into the home.

The Chicago Learning Center is a response by Texas Instruments, Dallas, TX, to the difficult problem of marketing today's increasingly affordable, yet complex electronic products to the people who can benefit from them.

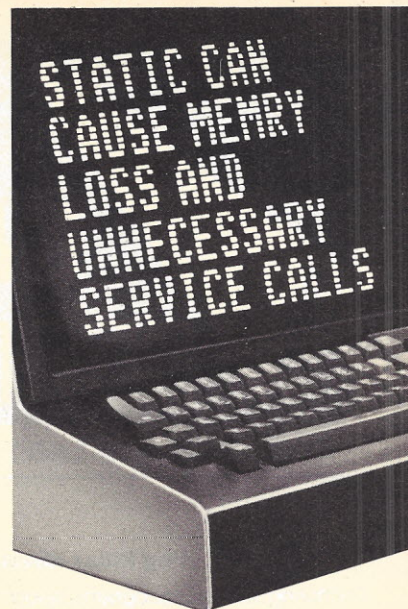
The center will offer a broad range of seminars, lectures, workshops, demonstrations, and videotape courses on TI electronic products and applications. In order to meet the needs of as many people as possible, these activities will take place not only at the center itself, but also in a network of schools, corporations, and other institutions and facilities in the greater Chicago area. Some of the educational services will be free; others will carry a nominal tuition.

In addition to providing educational services, the center will offer a variety of books, manuals, literature and software, as well as accessories for electronic products, such as batteries, power packs, thermal paper and cables.

This publication is available in microform.

University Microfilms International

300 North Zeeb Road Dept. PR Ann Arbor, MI 48106 USA



Protect yourself against the high cost of static

Electrostatic discharge, in addition to causing problems like the one above, can damage delicate electronic control and logic circuits. It takes so little voltage that you might not even feel the spark.

As little as 500 volts can send erroneous data, alter "memory", write incorrect data on a disk, or cause printers to run wild, throwing paper into the room. All of which means expensive service calls and even more expensive system down time.

Only 500 volts, yet you can easily generate over 12,000 volts of static charge just walking across a carpet. Even on a vinyl floor, 4000 volts is not uncommon.

The solution is simple

3M Brand Static

Control Floor

Mats can

create an

inexpensive

"island of

protection"

around your

delicate

electronic equipment,

harmlessly draining the

static charge from opera-

tors and other personnel.

For as little as the cost of a single static-related service call, you can say goodbye to all these problems.

3M Brand Static Control Floor Mats come in hard mats for easy movement of castered chairs, and soft mats for comfortable standing.

For information about how you can purchase 3M Static Control Floor Mats, call toll free

1-800-328-1300

(In Minnesota, call collect 612-736-9625.)

Ask for the Data Recording Products Division.

3M Hears You...

3M



Fog Index Revisited

Following are two programs about the fog index, supplied by our readers. In case you missed the earlier columns, the fog index is a method of calculating the difficulty of written material. It is based on a formula involving the number of difficult words, and the length of sentences in a text.

If:

A = average length of sentences

B = percentage of words over 3 syllables

Then:

Fog Index = .4 * A * B

Leo Jankowski, from New Zealand, sent the following letter about the problem of finding three-syllable words. His programs are shown in listings 1-3.

There are several ways of looking in a text for words that have three or more syllables. Unfortunately, no single method can be successful, since so many English words break rules followed by other groups of words. Four counting methods suggest themselves.

The first methods (listing 1) checks for words of eight or more letters long. It wrongly counts words such as something, somewhere and words ending in ed (such as controlled). Words like area, unity, iota, paragon and Iowa are not counted. In fact, these four-letter words would need a separate, elaborate routine of their own, no matter what method we use.

With listing 2 (another method), count the vowels (including y) to count a syllable. If two vowels come together, count once only. Count if 'y' ends a word. This method fails on those four-letter words and also on: isle, aisle and yclept! Then there's edible, principle, washable, terrible and horrible!

This is where the next two methods come to the rescue. Count consonants, which are indexed by the vowels in the word. Listing 3 counts if a vowel is followed by a consonant. Another method is to count if a vowel is preceded by a consonant. Also, count if a vowel (including y) begins or ends a word. Vowels immediately following another vowel are ignored. So words like terrible and horrible are picked up (even yclept!), but the problem of those four-letter words still remains.

No doubt a program could be written to take care of every exception. Unfortunately, it would take an inordinate length of time to run, compared to the program in listing 1.

Another reader from Chicago, IL, Judy Castle, sent in a fog index program that allows you to analyze ASCII text files

already recorded on diskettes. The program asks for the name of the file, opens the file and reads the text in one line at a time. As the program analyzes the text, it also prints it on the screen (line 110), and flashes a graphic character (line 120) over each letter.

Hurling brickbats

Breakout is a game for the TRS-80 Color Computer sent in by Paul Ruby of Rochester, PA. The object is to break through a wall of colored bricks by bouncing a ball off the wall. Like Pong, the player keeps a ball in play by hitting it with a paddle that can move horizontally across the bottom of the screen. If the player misses a ball, he starts over with a new one. The game ends after a set of four balls.

The wall is drawn by the FOR loop starting at line 30. The color of the bricks in the wall is set by a random number between 3 and 8 in line 50. Line 60 initializes the position of the ball near the center of the screen. The flag Q is used to indicate whether the ball will move to the left or right, and flag W indicates whether the ball is moving up or down.

In line 110, the joy stick is read and its value is stored in the variable D, which is used to indicate the horizontal position of the paddle. Lines 120 and 130 ensure that the paddle cannot move off the screen. The paddle, which is five graphics blocks wide, is drawn by lines 140 through 160.

Lines 170-200 check the position of the ball and change the direction flags Q and W to make the ball bounce off the edge of the screen. The new position of the ball is worked out by lines 220-260. If the horizontal position flag, Q, is equal to 0, the value of X will be increased by 1 or 2, depending on the RANDom number in line 230. If the vertical motion flag, W, is also equal to 0, the value of Y will be increased by exactly 2 (line 250). The net effect of increasing both X and Y makes the ball move toward the lower right hand side of the screen.

The POINT command of line 290 examines the color of the position immediately below the ball to determine if the ball has hit the paddle. Lines 350 to 390 are executed only if the ball is missed. The number of balls used, A, is incremented in 360 and a "missed ball sound" is generated in lines 370 and 380. The POINT command of line 330 checks to see if the ball has hit the wall. If so, the routine at line 500 increases the score and changes the direction of the ball. Note the equation in line 510; it is useful for alternating the value of a flag between 1 and 0.

Allowing neither steering nor English

This game allows for neither steering the ball nor putting "English" on it. Once the ball bounces off the paddle, it moves up and to the right or left at a random angle. To allow the paddle to "steer" the ball as it moves up, you can add:

```
125 IF W = 1 THEN X = D
```

A more complicated method of controlling the motion of the ball could be accomplished by checking where the ball hits the paddle and letting that determine the angle of rebound. If X equals D when the ball hits the paddle, it has to hit in the middle. If the absolute value of X - D = 2, then the ball hit on the edge of the paddle. In the current version of the game, the angle that the ball moves is determined by the random number added to or subtracted from X in lines 220 and 230. If these random numbers were replaced by a variable determined by where the ball hit the paddle, a different type of "steerability" could be added to the game.

According to Ruby, it is possible to increase the speed of the game on some color computers by POKEing 65495,1. This appears to increase the clock speed. To return to normal speed, POKE 65494,1.□

Listing on page 148

If you liked MICROPROOF, then you'll love SON OF MICROPROOF:

ELECTRIC WEBSTER^{T.M.}

The ultimate spelling checker.

IMPROVED:

- One-step proofing and correcting.
- Lists errors to screen or printer.
- Can display errors in context.
- Can display dictionary to locate correct spellings.
- New precise symbolic dictionary will not miss an error.
- Remarkably compact (50,000 word dictionary will fit on one 5 inch disk).
- Even FASTER than MICROPROOF (formerly the fastest available).
- Simple Grammatical Checking (Optional Feature).
- Hyphenates automatically (Optional Feature available for some Word Processing programs).

SELECT APPROPRIATE RESPONSE:

CORRECT MISPELLED WORD:	ENTER CORRECT WORD
LEAVE WORD "AS IS":	HIT <ENTER> KEY
DISPLAY WORD IN CONTEXT:	?
DISPLAY DICTIONARY:	@
ADD WORD TO DICTIONARY:	+
EXIT:	!
WORD:	(Your error)
RESPONSE:	

EASY TO USE: Prepare your text on any Z-80 based microcomputer, using any of a number of popular word processing programs. When you are finished, enter the appropriate command, and ELECTRIC WEBSTER proofreads your document, displaying misspellings and typos on the screen. Then correcting ELECTRIC WEBSTER can display each error separately, requesting you to enter the correct spelling for each. You are also given the option of displaying errors in context or adding words to ELECTRIC WEBSTER's 50,000 word vocabulary. If you do not know the correct spelling you may also ask ELECTRIC WEBSTER to look it up for you and display the dictionary. Finally, ELECTRIC WEBSTER corrects your document. All in less than a minute.

LOW PRICES: Standard MICROPROOF is available for \$69.50 (TRS-80). Standard ELECTRIC WEBSTER is available for either \$89.50 (TRS-80 Model I or III, Apple) or \$149.50 (CP/M, TRS-80 Model II and all others). The optional correcting feature can be added at any time for an additional \$60. Correction feature can be ordered with patch to integrate with your word processing software. For each patch, optional Grammatical Checking feature, or optional Hyphenation feature, add \$35. (Integration patch not necessary for Wordstar.TM)

SPEED is the single most important factor in a dictionary program. All dictionary programs will find your potential errors but if the program is too slow, you are not likely to use it. ELECTRIC WEBSTER's speed is outstanding. It can proofread a several page letter in 20 seconds.

ELECTRIC WEBSTER's FULL 50,000 WORD VOCABULARY saves you time and allows you greater confidence in the lists of potential errors that ELECTRIC WEBSTER identifies. The mini-dictionary programs, with their 10,000 and 20,000 word vocabularies, have many correctly spelled words omitted from their vocabularies. Consequently, they identify as potential "errors" many words that are actually spelled correctly; five to ten times as many such words as does ELECTRIC WEBSTER. So, when you use ELECTRIC WEBSTER, you will have far fewer extra words to evaluate, a major time savings. There will be less need to look up words in order to verify that they are in fact spelled correctly. The extra 30,000 words in ELECTRIC WEBSTER's vocabulary assures you confidence in the error lists that Electric Webster generates.

HERE'S WHAT THE REVIEWERS HAVE TO SAY ABOUT MICROPROOF:

"I have already found that the use of (MICROPROOF) has greatly enhanced the quality of my letters and reports. This is a very useful product and should be obtained by anyone who uses a word processor."

Michael Tannenbaum, CPA
80 Microcomputing, August 1981

"The summary review of this program? One word — Excellent. I highly recommend it for anyone using a word processor for any need — articles, manuals, reports, and even letters of substantial length."

A. A. Wicks - Program Previews
Computronics, September 1981

In a comparative review of proofreading programs (with smaller dictionaries), MICROPROOF was found to be considerably faster than all the others, when tested against a 400 word sample document.

Phillip Lemmons
BYTE Magazine, November 1981

"(MICROPROOF) operates with good speed and efficiency. A 1500 word document took 26 seconds to load, process, and proof when the program was run on a TRS-80 Model II under CP/M."

"Once the program is integrated, it is very friendly and any person able to use a word processing program can master it in moments."

Frank Derfler
Info-World, January 1982

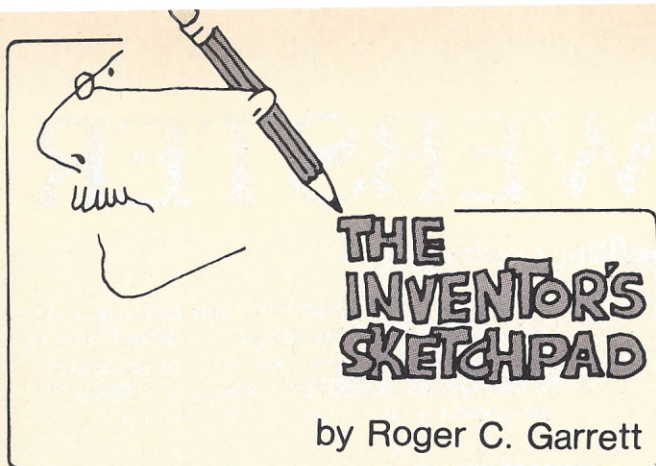
See your local microcomputer dealer or write to:

CORNUCOPIA SOFTWARE

Post Office Box 5028, Walnut Creek, California 94596 • (415) 524-8098

NOW
AVAILABLE
FOR APPLE!





Flat Panel Display with Depth

In last month's column, I described an approach to generating relatively static displays using a magnetic liquid technology. This month's column will demonstrate how a color display might be made, based on my approach.

One common approach to color displays using liquid crystal technology is to bind a dye molecule to each crystal (figure 1). When all of the crystals are aligned (either by passing a current through them as with most LCDs, or by bringing a magnetic field nearby as with the technique described last month), the ambient room light passes freely through the crystal layer and is absorbed by a black layer on the back surface of the display. But when the crystals are randomly oriented, the ambient light does not pass through. Instead, it impinges upon the dye molecules, which absorb only certain wavelengths of light and reflect the rest. This results in

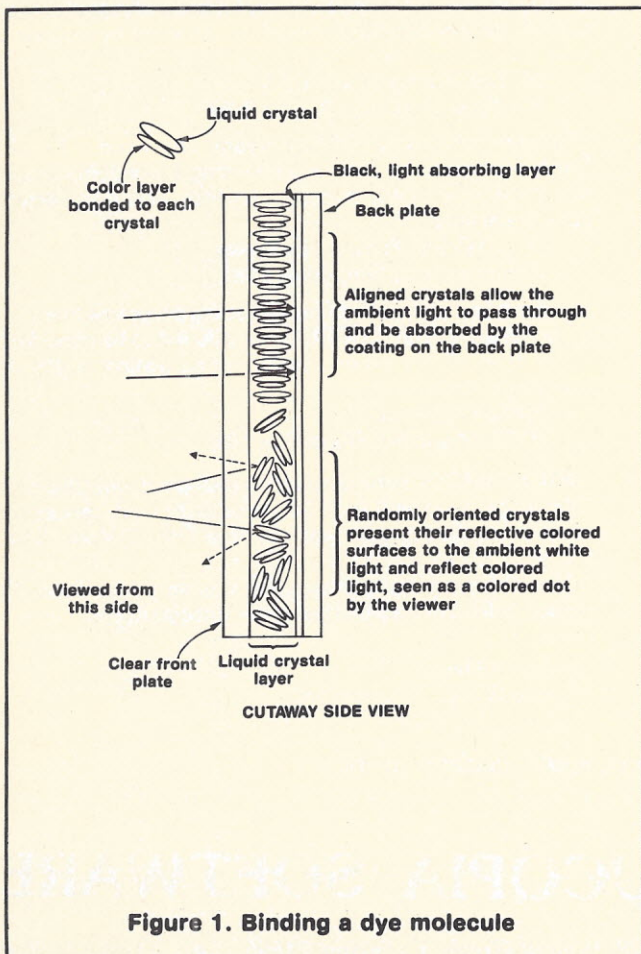


Figure 1. Binding a dye molecule

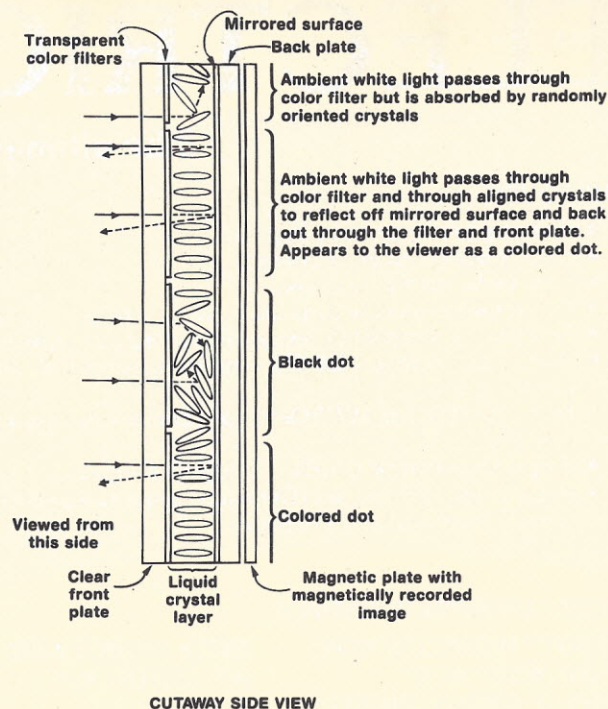


Figure 2. Use of electrically alignable crystals

colored light being reflected and a colored spot being visible to the viewer.

Such an approach is fine if we want a display that is all of the same color, since we can fairly easily distribute the dye-bonded liquid crystals throughout the liquid crystal chambers of the display, just as we would for a normal, un-colored LCD. But trying to produce a multi-colored display is quite a bit more difficult, if not utterly impossible. The manufacturer would have to place individual droplets of variously colored liquid crystals into thousands (or perhaps hundreds of thousands) of separate chambers. In the case of my magnetically aligned crystal approach in which all of the liquid resides in one large flat chamber, keeping the individual droplets separated is simply out of the question.

So we take a more simplified approach. We forget about trying to bond colored dyes to the liquid crystals and use our standard everyday transmissive type crystals. These are the kind that allow light to pass when aligned but absorb the light when randomly oriented. Figure 2 shows an approach using magnetically alignable crystals, but the technique works just as well with electrically alignable crystals.

We place a set of transparent colored filters into our display device. We will have three different colors—red, green, and blue, and there will be a separate filter for each dot (or pixel) of our display. Assuming our display is 512 lines by 512 dots per line, we will have $512 \times 512 = 262,144$ pixels, each one having a red, green or blue filter dot in front of it. Now as the ambient light passes through a filter dot, it becomes colored according to the color of the filter. It then passes through the liquid crystal layer behind it (assuming that the crystals for that pixel are aligned), bounces off of the mirrored surface of the back plate, and back out to be seen

~~UNBELIEVABLE!~~

BELIEVE IT!

**State-of-the-art Single-Board computer now available!
Can be used in S-100 (Master, Slave, Multi or Single user)
or Stand-Alone configurations.**

FINALLY, state-of-the-art performance is available at an affordable price.

COMPARE THESE FEATURES:

- Z80A or Z80B
- 4 TIMERS (ZCTC)
- 64K RAM (64KX1 CHIPS)
- 2 SERIAL PORTS (ZSIO)
- 4 PARALLEL PORTS (ZPIO)
- UP TO 16K EPROM (2732)
- NEC FLOPPY DISK CONTROLLER
(UP TO FOUR 8" DOUBLE SIDED/DOUBLE DENSITY DRIVES)
- INTELLIGENT WINCHESTER INTERFACE
- ON-BOARD EPROM BURNER
(DOES NOT REQUIRE 24V)

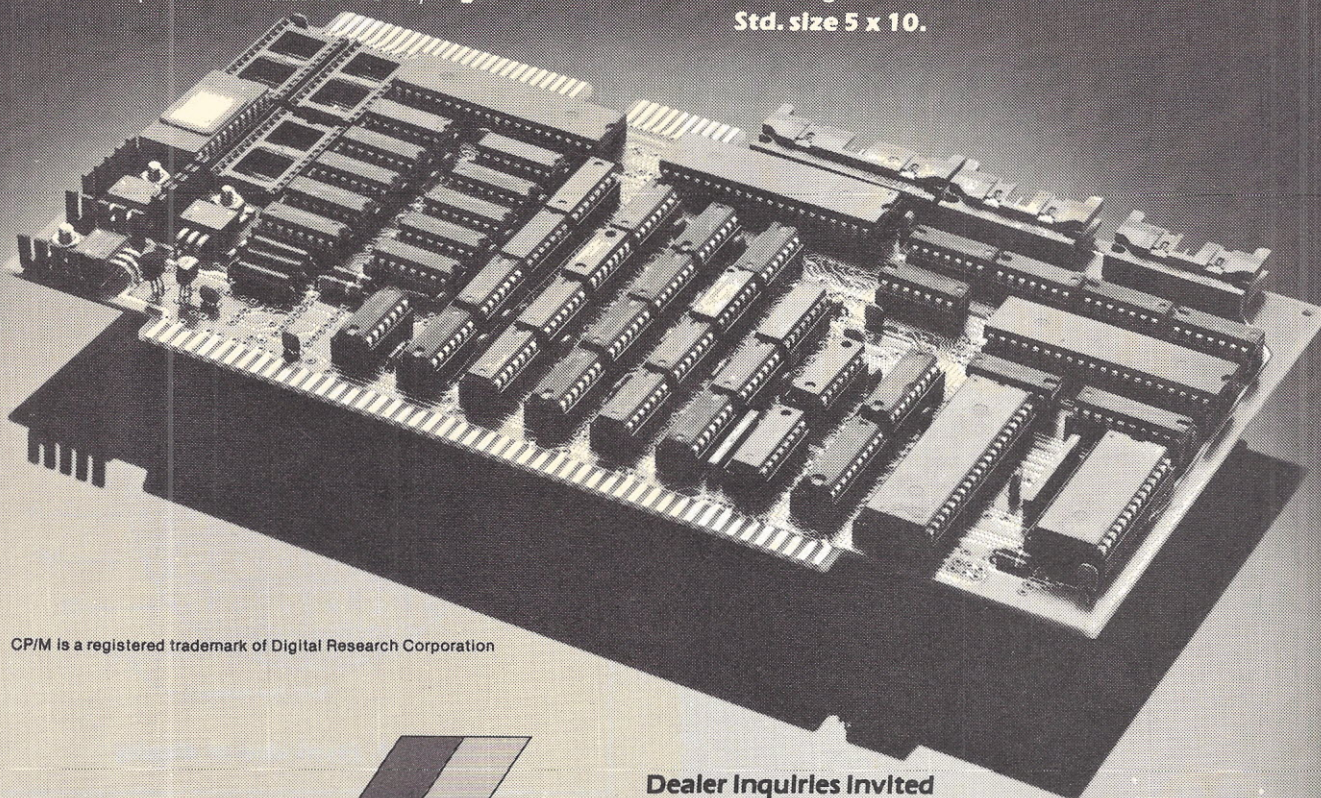
FOR THESE SINGLE QUANTITY PRICES:

4MZ VERSION (Z80A)	\$895 ⁰⁰
6 MZ VERSION (Z80B)	\$1,195 ⁰⁰
4 MZ SLAVE PROCESSOR (NO DISK CONTROLLERS ON BOARD)	\$795 ⁰⁰
6 MZ SLAVE PROCESSOR (NO DISK CONTROLLERS ON BOARD)	\$1,095 ⁰⁰

The S-100 version of this product can act as a Master processor, Slave processor, or Intelligent peripheral controller. Intra-processor communication is achieved through the use of efficient, high speed buss transfers using special hardware/software techniques.

We also have what we think is one of the best implementations of a CP/M BIOS available off the shelf. The BIOS has the following features:

- All Devices **INTERRUPT DRIVEN**
 - Type Ahead Input/Output Buffers
 - Real-Time Clock
 - Time Of Day Clock
 - Multi-level User Password Support
 - Menu Driven Utilities for Format, Disk Copy, etc.
 - Unique Configuration Utility Program for Setting Baud Rates, Changing Step Time, Changing Passwords, etc.
 - Cylinder Concept used for Double Sided /Double Density Configuration Resulting In Increased Performance
- Std. size 5 x 10.**



CP/M is a registered trademark of Digital Research Corporation

**HARDWARE
SOFTWARE**



Dealer Inquiries Invited

SIERRA DATA SCIENCES

Fresno, California

Marketing Division

21162 Lorain Ave./Fairview Park, Ohio 44126 / (216) 331-8500

TRISWATCH

Keeps your TRS-80 Mod II up with the times.

The Triswatch, formally known as the CCB-II, is a **clock, calendar, and audio alarm** rolled into one!

- For TRSDOS users, the CCB-II eliminates the hassle of setting the time and date when you reset your Mod II.
- The P&T CP/M® 2 system date and time are synchronized to the CCB-II each time the system is reset.
- The CCB-II is directly accessible from any language that allows direct port input and output.
- A pacemaker battery is included, which provides over 8 years of continuous timekeeping.

Keep up with the times and order the CCB-II for \$175 plus shipping.



TRS-80 is a trademark of Tandy Corp.
CP/M is a registered trademark of Digital Research Inc.

PICKLES & TROUT

P. O. BOX 1206, GOLETA, CA 93116. (805) 685-4641

Warning: Installation requires opening the Model II, which may void its warranty. We suggest waiting until the warranty period has expired before installing the CCB-II.

CIRCLE INQUIRY NO. 72

S-100 Modem

An Atlanta bulletin board system uses a Hayes S-100 modem around the clock. Since March 1979, it has logged over 21,500 calls and been down a mere 10 minutes. For performance like this, depend on the Hayes Micromodem 100.™ Features include automatic dialing/answering, 45 to 300 baud operation, a built-in serial interface and direct connection to any modular phone jack.

The Micromodem 100—and Micromodem II™ for Apple II® computers—are now available nationwide. Call or write for the name of your nearest dealer.



Hayes Microcomputer Products Inc.

5835 Peachtree Corners East, Norcross, GA 30092 (404) 449-8791

Micromodem 100 & Micromodem II are trademarks of Hayes Microcomputer Products Inc. ® TM Apple Computer Inc.

CIRCLE INQUIRY NO. 44

by the viewer as a visible colored spot. For those pixels whose crystals are randomly oriented, the viewer will see only a black spot, since the light, although colored by the filter, will be absorbed by the crystal layer. By appropriately controlling

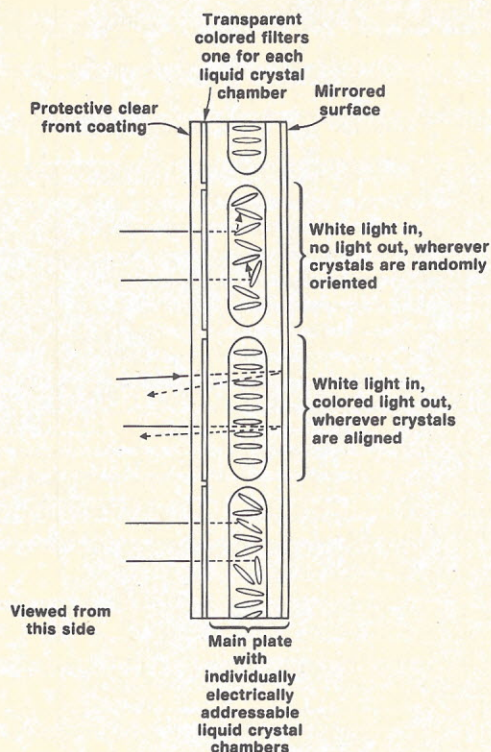


Figure 3. Use of electrically controllable crystals

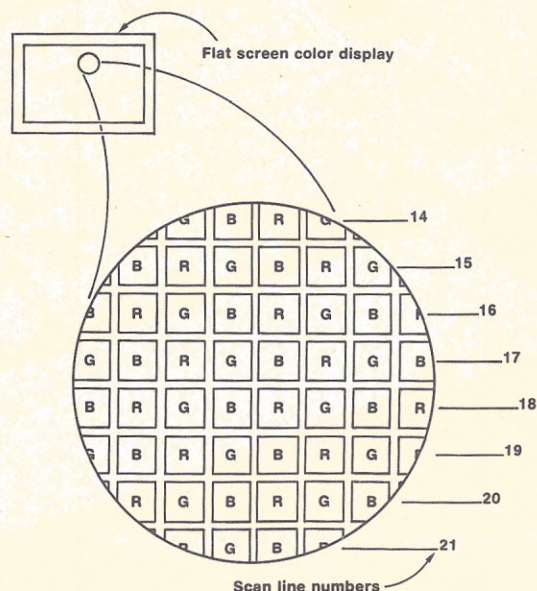


Figure 4. Front view of display

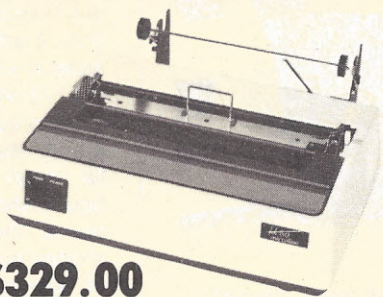
which pixels are "on" (crystals aligned) and which are "off" (crystals non-aligned), we can generate color displays.

Since it would be nice to be able to generate fairly interactive displays (i.e. ones that can be updated relatively quickly), we will want to build our display using electrically controllable crystals, rather than magnetically controllable ones. Figure 3 shows just a display. In this case, the liquid crystals reside in

APRIL SPECIALS

WE CARRY THE COMPLETE LINE OF ATARI SOFTWARE, PERIPHERALS AND ACCESSORIES.

OKIDATA MICROLINE 80



\$329.00

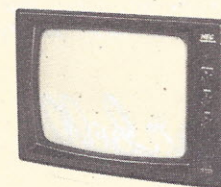
ATARI 810 DISK DRIVE



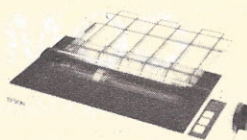
\$429.00

PERSONAL COMPUTERS

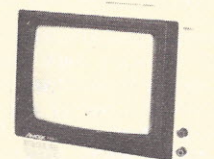
CBM 8032 Computer	1149.00	Epson MX-100 FT	729.00
CBM 8050 Disk Drive	1349.00	NEC PC-8023 Printer	629.00
CBM 4032 Computer	1029.00	NEC 7710 Spinwriter	2345.00
CBM 4040 Disk Drive	1029.00	NEC 7720 Spinwriter	2695.00
CBM 4022	649.00	NEC 7730 Spinwriter	2345.00
CBM VIC-20	269.00	NEC JC 1201 M(A) — Color 12" Monitor	359.00
Amdek 100G	159.00	NEC 12" JB 1201M Monitor	159.00
Amdek Color — 1 13" Color Monitor	329.00	Okidata Microline-80	329.00
Microtek 16K Ramboard for Atari 800	79.00	Okidata Microline-82A	499.00
Microtek 32K Ramboard for Atari 400 and 800	149.00	Okidata Microline-83A	729.00
Qume Sprint 9/45 (Full Panel)	2295.00	Diablo 630	1995.00
Atari 400 16K	339.00	M & R Sup-R-Terminal	279.00
Atari 410 Recorder	60.00	Microsoft Soft Card (Z-80)	279.00
Atari 825 Printer	599.00	Hazeltine 1420	799.00
Atari 850 Interface	139.00	Northstar Horizon II 32K QD	2925.00
Atari 810 Disk Drive	429.00	Anadex DP-9500/9501	1249.00
Atari 800 16K	749.00	Televideo 910	559.00
Epson MX-70	349.00	Televideo 912C	669.00
Epson MX-80	449.00	Televideo 920C	689.00
Epson MX-80 FT	549.00	Televideo 950	929.00



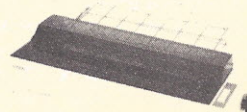
**NEC GREEN
12" MONITOR JB 1201M
\$159.00**



**EPSON MX-80
INTERFACE & CABLES IEEE \$55.
RS-232 \$70. TRS-80 CABLE \$35.
\$449.00**



**AMDEK COLOR-1 MONITOR
\$329.00**



**EPSON MX-100 FT PRINTER
\$729.00**

**PRICES ARE SUBJECT
TO CHANGE
WITHOUT NOTICE**

CALL TOLL FREE!

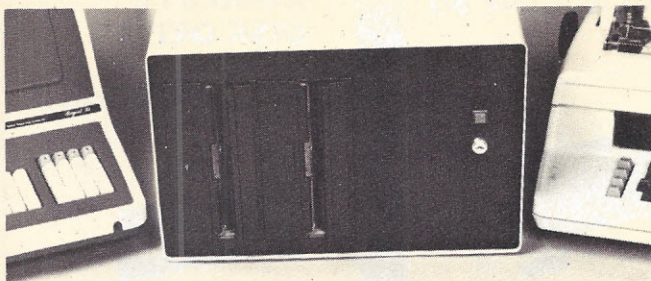
EAST COAST
1-800-556-7586
COMPUTER SHOPPING CENTER
12 Meeting Street
Cumberland, RI 02864
1-401-722-1027
TELEX 952106

WEST COAST
1-800-235-3581
COMPUTER SHOPPING CENTER
3533 Old Conejo Rd. #102
Newbury Park, CA 91320
1-805-499-3678
CA. TOLL FREE 1-800-322-1873
TELEX 182889

COMPUTER SHOPPING CENTER

We Accept C.O.D.'s • Stock Shipments Same Day or Next • No Surcharge for Credit Cards
• All Equipment Factory Fresh w/MFT Warranty • We Carry the Complete Line of Personal Software
• Prices do not Reflect Shipping Charges
Rhode Island and California Residents please add 6% Sales Tax

MOVE UP TO TARBELL



Tarbell starts where small systems leave off, providing storage from 1 to 20 megabytes. This means Tarbell is capable of growing with your needs.

Here's what you get in the system: Z80 4Mhz CPU with memory management, timer and full interrupt capability, 2 RS-232 serial ports with handshaking, 64 K bytes of random-access memory, double density floppy disk interface, 2 double density

floppy disk drives, cabinet, power supply, cables and software including CP/M 2.2, CBASIC, Tarbell BASIC and Tarbell DataBase.

Tarbell makes available word processing, inventory control with bill of materials, mailing lists and other business software.

The Tarbell Empire Series is delivered assembled, tested, and with a FULL six-month warranty on parts and labor.

Tarbell
Electronics

The One-Stop Shopping Service

950 Dovlen Place, Suite B
Carson, CA 90746
(213) 538-4251

CIRCLE INQUIRY NO. 84

COMPUMAX

is pleased to announce

MICROBASE®

the DATA BASE MANAGEMENT package for the small business and for the home.

Inexpensive and easy to use, **MICROBASE** enables you to set up your data bases without any programming, by running interactive, conversational programs. You can produce a variety of user-defined reports using your own data bases, just by following simple routines in plain English. Menu-driven and user-friendly, **MICROBASE** is designed for the first-time computer user. Written in Microsoft BASIC under CP/M*, it is available for a wide range of microcomputers.

Certain classes of Microsoft Basic programs will be easily interfaced with **MICROBASE**, and forthcoming versions of the Compumax business packages will also be integrated with **MICROBASE**. Of course, **MICROBASE** can be used by itself for your data base management.

For more information, consult your Dealer or contact

COMPUMAX

P.O. BOX 7239, MENLO PARK, CA 94025

*CP/M is a registered trademark of Digital Research.
MICROBASE® is a registered trademark of Compumax.

CIRCLE INQUIRY NO. 19

individually (and electrically) addressable chambers, rather than in one massive chamber as depicted in the previous figure. It should be easier to see how each color filter corresponds to a single pixel of the display.

Looking at figure 4, we can see what the display would look like from the front. It is divided up into a rectangular array of dots. Each dot is made up of a color filter, here denoted by a letter (r = red, g = green, b = blue), and a liquid crystal chamber. Although I previously described these as pixels, it is more precise to define a set of three dots—one red, one green, one blue—as constituting a single pixel. Each horizontal "scan line" is comprised of a set of these pixels. The figure shows one possible way of arranging the dots into pixels. There are a variety of ways to group them as demonstrated by the several schemes employed by manufacturers of television sets. For our purposes here, however, let's assume we are using this simplified approach.

Scan lines categorized

Each "scan line" of the display is logically numbered, as shown. What is most important here, however, is that we can divide the scan lines into two groups—the odd and even numbered ones. This will come in handy, since we are going to make our display more than just a colored display; we are going to make it a three-dimensional display.

In figure 5, we have made our basic display a bit more complex. We still have an array of individually electrically addressable liquid crystal chambers, which we can (under

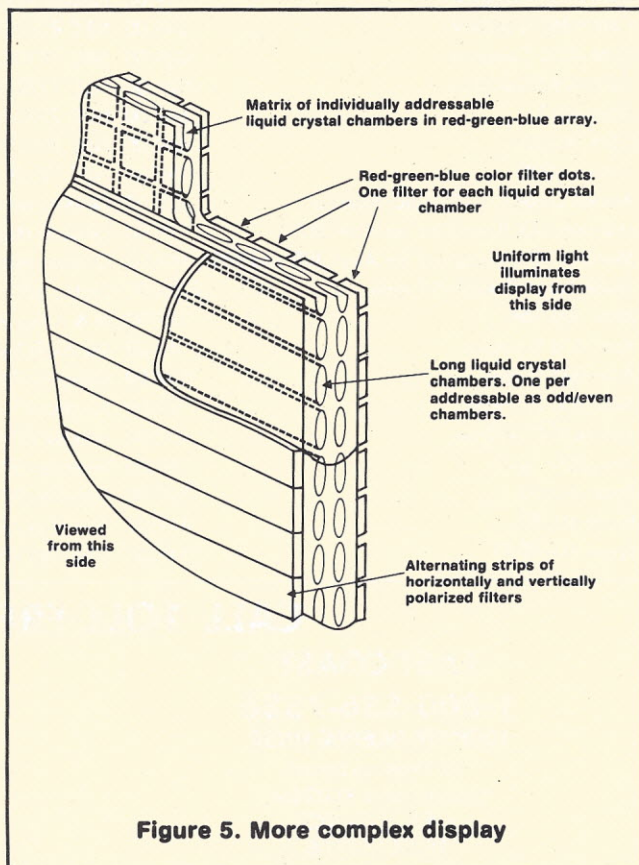


Figure 5. More complex display

computer control) turn on and off to generate our color displays. But we have added a set of long liquid crystal chambers, one such chamber for each scan line. In front of each long chamber, we have placed a polarized filter. For the odd numbered scan lines, these filters are vertically polarized; for the even numbered scan lines, they are horizontally polarized. All of the odd numbered long chambers are electrically connected, such that activating one activates all. Likewise for the even numbered ones.

With such a setup, we can now control which set of scan lines is visible at any given point in time, the even numbered

Radio Shack Has Everything You Need for Your TRS-80®



A File Boxes for Your Diskettes. Two open and shut cases for protecting 5¼" or 8" floppies. Holds 50-60, with index dividers. Durable acrylic.

For 5¼" Diskettes. #26-1453, **\$29.95**

For 8" Diskettes. #26-4953, **\$39.95**

B Disk Drive Head Cleaning Kit. Helps prevent read/write errors. Easy and safe — just apply solution to a cleaning diskette (two included) and run it in drive for 30 seconds.

For 5¼" Drives. #26-407, **\$29.95**

For 8" Drives. #26-4909, **\$29.95**

C Genuine TRS-80 Diskettes. Best you can buy. Certified error-free. Extra-long life, double density, soft sector.

5¼" Single Diskette. #26-305, **\$4.95**

5¼" Three-Pack. #26-405, **\$13.95**

5¼" Ten-Pack. #26-406, **\$39.95**

8" Single Diskette. #26-4905, **\$7.50**

8" Ten-Pack. #26-4906, **\$59.95**

D Diskette Library Cases. Protection against dust and curling. An easel insert pops-up for easy selection. Holds ten floppies. Polystyrene.

For 5¼" Diskettes. Gray. #26-1452, **\$3.95**

For 8" Diskettes. Brown. #26-4952, **\$4.95**

E Anti-Glare Mask. Solves reflection problems. No loss of resolution. For TRS-80 Models I, II and III. Not for color monitors. #26-511, **\$16.95**

F Anti-Static Spray. Prevents static electricity build-up that can attract dust and damage equipment. Apply to accessories, video display and carpet. 16 ounces. #26-515, **\$5.95**

G Printviewer. Magnifies and highlights a single line of your printout. Reduces errors. Clear plastic with yellow "line window." Includes 10 and 12 cpi scales. #26-1313, **\$2.95**

H Logic Flowchart Template. This durable, clear-plastic "stencil" with ANSI flowchart symbols and ¼" layout grid makes it easy to draw pro-quality charts. #26-1312, **\$3.95**

I Stacking Data Trays. For standard 14⅞"-wide printouts. Eliminates damage to paper caused by using an undersized tray. #26-1309, **each \$6.95**

Radio Shack

The biggest name in little computers™

A DIVISION OF TANDY CORPORATION

Prices may vary at individual stores and dealers. Some items may require special order.

And there's more! Send for your free TRS-80 catalog.

Radio Shack, Dept. 82-A-137
1300 One Tandy Center
Fort Worth, Texas 76102

NAME _____

ADDRESS _____

CITY _____

STATE _____

ZIP _____

NAME _____

ADDRESS _____

CITY _____

STATE _____

ZIP _____

CIRCLE INQUIRY NO. 75

THE CAT'S-EYE VIEW OF COLOR



The CBX Series: affordable, intelligent color imaging systems

The CBX subsystem interfaces with your PDP-11,* LSI-11* or other computer to provide high resolution imaging capabilities. With the optional frame grabber and television camera, you digitize full-color images from any source, using a computer-controlled color filter system. Then analyze, reprocess, mix, save, retrieve . . . the power of the CAT is at your command.

Each CBX system includes:

- Your choice of CAT-100, 400 or 800
- 12 slot S-100 mainframe
- Z-80A processor with specialized firmware in PROM
- Parallel interface connector

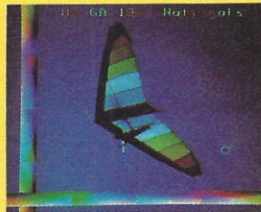
A range of options and accessories are available, including:

- TV cameras • Lightpens • TV monitors • Interface card and connecting cables.

*PDP-11 and LSI-11 are trademarks of Digital Equipment Corporation.



Digitized X-ray



Digitized Real Color



Computer graphics



Landsat photo

DIGITAL GRAPHIC SYSTEMS, INC.

935 Industrial Avenue, Palo Alto, CA 94303 (415) 856-2500

ones (figure 6) or the odd numbered ones. When we activate odd numbered ones, light freely passes through only the odd-numbered long chambers. It is blocked from passing through the even-numbered chambers. The light that does get through then passes through the color filters and image cham-

***We do not see
exactly the same thing
with our left eye
as we do
with our right eye.***

bers of the odd scan lines. Anyone viewing the display would see only that portion of the image that resides in the odd numbered scan lines. When we reverse the situation, turning off the odd numbered lines and turning on the even numbered lines, the viewer can see only the even numbered scan lines.

Why, you ask, would we want to do such a thing? Look at figure 7 and it should all become clear. Human beings, having binocular vision, perceive depth (3D) when the brain interpolates between the two separate images seen by our eyes. We

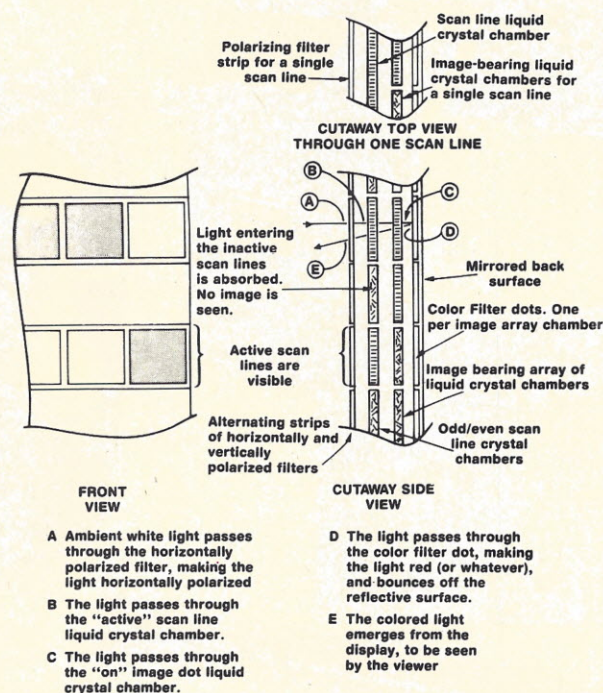


Figure 6. Reflective-type display

do not see exactly the same thing with our left eye as we do with our right eye. If we can present each eye with a view corresponding to what it would see if it were viewing a real three-dimensional scene, even if the images were artificially produced as with a computer, the person would perceive a three-dimensional image. The problem is in presenting a separate image to each eye when all we have is one display device. The solution is to alternate between two images, a left eye

Vistavision 80

Invisible or Invincible?

It all depends on your perspective.

The Vision 80[®] is a video display card that gives your Apple[™] terminal an industry-standard 80 column by 24 line display screen with a full 128 character set including upper and lower case letters with three dot descenders. It is compatible with all existing Apple[™] BASIC software and allows the use of 80 column lower case text with programs written in BASIC, FORTRAN Pascal, Microsoft CP/M[™] and ASSEMBLER. Full communications driver support allows the Apple II[™] to operate as an intelligent terminal

Definitely invincible. Ask Softalk magazine editors, who rated Vision 80[®] the Best Apple-video display card on the market.

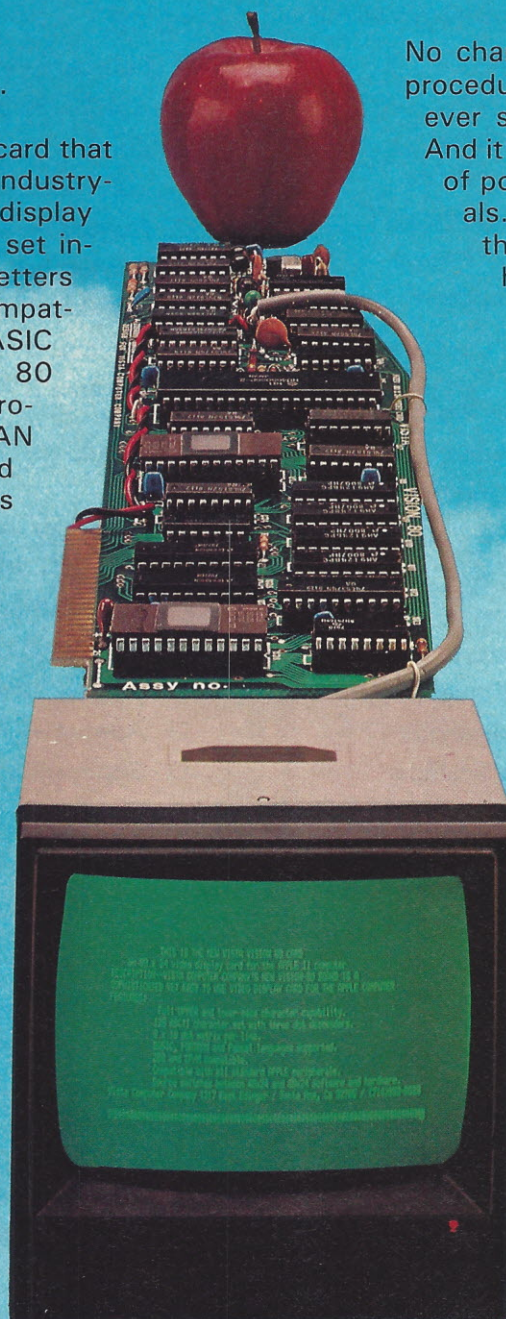
But the Vision 80[®] card has an "Apple" command vocabulary including H-tab, V-tab, HOME, TEXT, PR# GRAPHICS).

No changes in operating or programming procedures are necessary to produce whatever sophisticated displays you require. And it doesn't interfere with the operation of popular Apple[™] compatible peripherals. Except for the enhanced display, the enhanced display, it's as if you had never installed the Vision 80[®] in your Apple II[™] computer.

Definitely invisible.

Ask your local computer dealer for a demonstration of the invincible, invisible Vision 80[®] video display card by Vista Computer Company. Or correspond with us directly: Vista Computer Company, Inc. 1317 East Edinger, Santa Ana CA 92705, (714) 953-0523. Toll free order line: (800) 854-8017.

Be sure to inquire about our new Vision 40, a softscreen programmable character generator for Apple II[™] computers. It's great for graphics and perfect for foreign language applications.



Perceptive Perspective

Vista

COMPUTER COMPANY, INC.

1317 East Edinger • Santa Ana, CA 92705

714-953-0523

800-854-8017

CIRCLE INQUIRY NO. 90

©1981 Vista Computer Co., Inc.

Apple and Apple II are trademarks of Apple Computer Inc.

CP/M is a trademark of Digital Research Inc.

INTERFACE AGE BACK ISSUES

1981

- ☐ January — Buyers Guide
- ☐ February — Computer Graphics
- ☐ March — OEM/Industrial
- ☐ April — New Products/Personal Computing
- ☐ May — Business Applications/Micros vs Minis
- ☐ June — Computer Languages
- ☐ July — New Products Directory
- ☐ August — Business Applications
- ☐ September — Medical Applications
- ☐ October — Education/New Products
- ☐ November — High Capability Micros
- ☐ December — Future of Computers

1980

- ☐ January — Special Function Processors
- ☐ February — Home Applications
- ☐ March — Communications and the Computer
- ☐ April — Robotics
- ☐ May — Micro Buyers Guide
- ☐ June — Business Computers
- ☐ July — New Products Directory
- ☐ August — Introduction to Apple III
- ☐ September — Medical Applications
- ☐ October — Educational Applications
- ☐ November — New Products Directory
- ☐ December — The Future of Computers

1979

- ☐ March — Music
- ☐ April — Robotics
- ☐ June — Automated Home
- ☐ July — New Products Directory
- ☐ August/September — Micros for Handicapped

1979

- ☐ October — Hardware Index
- ☐ November — New Products Directory
- ☐ December — Video Graphics

1978

- ☐ February — Medical Applications
- ☐ April — Robotics
- ☐ June — Thoughts On The Future
- ☐ July — New Products Directory
- ☐ August — Games
- ☐ September — Education Applications
- ☐ October — Hardware Index
- ☐ November — Software Index
- ☐ December — Book Index

1977

- ☐ February — Micro Stock Options
- ☐ March — Hardware/Software Guide
- ☐ May — Floppy ROM #1
- ☐ June — Bionics
- ☐ July — New Products Directory
- ☐ August — Astronomy/Astrophysics
- ☐ September — Floppy ROM #2
- ☐ October — Meteorology/Environment
- ☐ November — New Products Directory
- ☐ December — Home Applications

1976

- ☐ April — Teleprinter Maintenance
- ☐ June — Teletype Maintenance
- ☐ October — Basic Diet Planning
- ☐ November — New Products Directory

Send check or money order payable to: **INTERFACE AGE Magazine**, P.O. Box 1234, Dept. BI, Cerritos, CA 90701

ALL ISSUES SUBJECT TO AVAILABILITY

U.S./Canada*: \$3.75 Each
Foreign/Mexico* \$5.50 Each

*Must be in US funds drawn on US bank



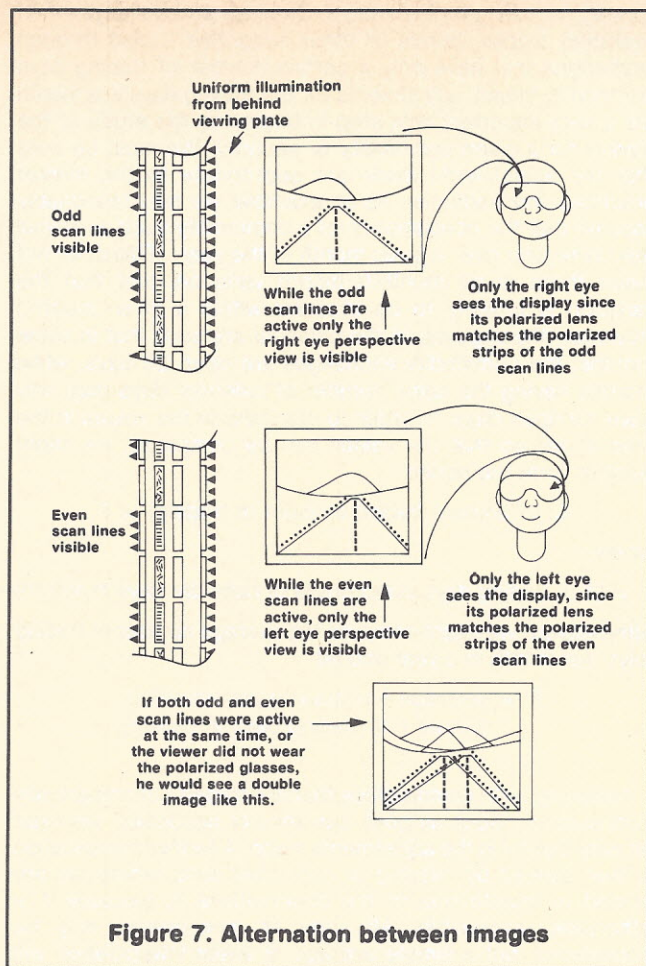
_____ Exp. Date _____ Signature _____

Send back issues checked to:

Name _____ Address _____

City _____ State _____ Zip _____ Country _____

*Due to increased postage costs we are forced to increase our rates as reflected above.



perspective image and a right eye perspective image, and to cause each eye of the viewer to see only that image meant for that eye.

With the flat screen display described here, we can do just that. We program our computer to generate left eye views (of whatever images we are trying to present) only for the even scan lines of our display, and to generate right eye views (of the same image) only for the odd scan lines. An independent clocking mechanism (independent of the image generation, that is), which alternately turns on and off the odd and even

scan lines, so that the viewable image alternates between left and right eye views. This alternation will have to occur at at least 30 Hz in order to avoid visible flicker.

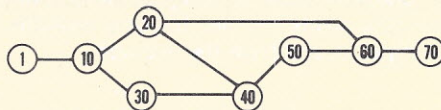
Now, if we were to look at this display, we would see the view shown in the bottom of figure 7, i.e. a composite of both views, since our eyes (fortunately) exhibit "persistence." This means that the two images, although not overlapping in time, seem to overlap in space. While we want to make use of this persistence, we do not want both eyes seeing both images, so we place a set of polarized eyeglasses on our viewer. These glasses are not the ordinary kind you find in drug-stores. Rather, they have the left lens vertically polarized and the right lens horizontally polarized. Only light that matches the polarization of the lens will pass through that lens.

This means that the image on the display for the left eye, which is vertically polarized by the filter on the even scan lines, will only be seen through the left eye vertically polarized lens. It will not be seen by the right eye, since the horizontally polarized lens of the right eye will not pass vertically polarized light. And similarly for the right eye, passing only the displayed image for the right eye. Since each eye experiences persistence, it will continue "seeing" the image for the short time, while the other image is being displayed. So the viewer does not perceive any flicker and the brain interpolates the two images into one complete three-dimensional image.

Now, using polarized filters to separate images is a technique that has been used for years. It has not been very successfully applied to computer or television displays because of the problems of aligning the CRT scan lines with their polarizing filters. This is due to the relative difficulty of assuring that a given scan line, generated by an electron beam and controlled by electrostatic or electromagnetic fields, repeatedly scans the exact same position on the screen. But with the advent of flat screen displays in which each pixel is precisely positioned, we no longer have the problems associated with CRTs. As I have shown here, we can now generate stereoscopically three-dimensional displays quite easily. And of course, we are not limited to computer-generated displays. We can use a set of stereo video cameras in which one supplies the odd scan lines and the other supplies the even ones.

Although we have yet to see commercially available flat screen displays using liquid crystal technology, there are several companies hard at work on the problems. Some have even demonstrated proof-of-concept prototypes. It should not be long before they are a commercial reality. After that, three-dimensional displays will not be far behind. □

TURN PROJECTS INTO PROFITS



pms-ii

Features:

- ★ True Critical Path Scheduling:
 - Early & late start and finish
 - % complete or actual start/finish
- ★ Designed for Floppy or Hard Disk:
 - 1000 Activities per project
 - Multi-drive access
- ★ Easy to Use:
 - User friendly/menu driven
 - Extensive input editing and error detection
- ★ Comprehensive Management Reporting:
 - Flexible report writer
 - Gantt Chart
 - Activity-on-arc diagram
 - Funding schedules
 - Net change for "What If" comparisons
 - Budget vs. actual material, labor and burden dollars
 - Conforms to C.E. ER 1-1-11 and ASPR 7-604.7 amended

MAXIMUM PROJECT CONTROL ON A MICRO BUDGET . . .

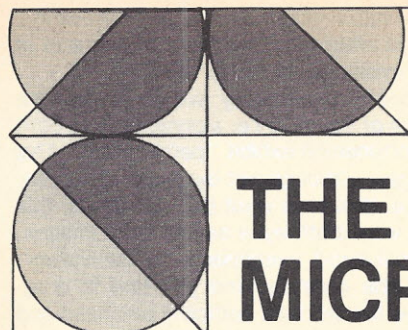
REQUIRES

- 64K
- CP/M™ with CBASIC2™
- Addressable Cursor
- 2 or more 8" Diskettes
- 132 Char Printer

SEND FOR FREE LITERATURE

NORTH AMERICA MICA INC.
11772 Sorrento Valley Rd.
San Diego, CA 92121
714-481-6998

CP/M REGISTER TRADEMARK OF DIGITAL RESEARCH • CBASIC2 REGISTER TRADEMARK OF COMPILER SYSTEMS



THE MICRO-MATHEMATICIAN

by Dr. John C. Nash

Forecasting—a tool for business

Minding the store is only a part of running a business. Frequently, the success of a venture is decided in the quality of the planning that precedes all the investment, work and worry. In such planning, the ability to look ahead and forecast the conditions and behavior of the markets in which the venture will operate lends a great advantage to the entrepreneur. In this month's column, we examine some aspects of forecasting. While this brief view is only superficial, the principles apply more generally to most modern forecasting methods.

Most forecasting methods rely on a conceptual model of the system to be previewed. This model may be a very crude picture in the mind of the entrepreneur of how the world behaves. For example, it may be as simple as a belief that a newspaper advertisement will increase sales between 10% and 20%. Alternatively, a large amount of practical business experience may be distilled into an equation for the same situation such as

$$(\% \text{ increase in sales}) = 0.0015 \times (\$ \text{ spent on advertisements})$$

For forecasting purposes, the latter of these two models is more precise in that the prediction it makes gives a specific figure for future sales. It may also be more accurate if it is reliably close to the actual outcome of spending on advertisements. We may, from past experience, even be able to refine the model by adding some statement about possible variation of the actual outcome from the prediction, e.g. $(\% \text{ increase in sales}) = 0.0015 \times (\$ \text{ spent on ads}) \pm 3\%$. Further refinements to the model would likely try to "explain" part or all of the variation that remains between the model and actual outcome.

For quantitative modeling, the models that are most useful have a mathematical formulation. This is not to denigrate many of the qualitative, technological or subjective assessment techniques for forecasting (particularly for predicting long-term changes) that have been developed and used frequently with highly satisfactory results. Here we will focus on the quantitative methods most appropriate for short to medium term previews. Furthermore, while large system models may simultaneously predict many properties or variables of interest, as in some of the large econometric models used in government and industry, we will restrict our attention to just one variable. Let us call this variable X_t , the value of the quantity of interest at time point t .

Here we have indirectly introduced the concept of time, which is implicit in all forecasting. The observed values of X form a time series, a sequence of observations for the variable, one for each time point. In almost all time series, the periods are considered equally spaced, so that numbering the observations sequentially

$$X_1, X_2, X_3, \dots$$

is sufficient to give their time distribution. The wording "considered equally spaced" is important, for it is usual to

ignore, for example, Saturdays, Sundays and holidays when analyzing stocks, bonds or other securities traded through exchanges that have only a certain number of trading days per month. In fact, adjustments for the trading days in a month are a very important first step in beginning the study of the market for a given commodity or security. We must be sure that the adjustments made are appropriate to the market practices and traditions. As an example, we may reasonably assume that the consumption of a commodity such as animal feed is regular over a given month of the year. (This does not mean there is no month-to-month variation; just that the variation is unlikely to be irregular within a given month.) However, the vagaries of the calendar are such that in some months, the commodity exchanges are open 23 days, while months having the same number of calendar days may only have 19 open days. In order to standardize the values in the time series so that the values can be compared, we might want to form the series

$$X_t = (\text{amount traded on day } t \text{ of trading}) \times F$$

where

$$F = (\# \text{ of trading days in month}) / (\# \text{ of calendar days in month})$$

Alternatively, we might compute the average number of trading days per month in a year and let

$$F = (\text{average } \# \text{ of trading days/month}) / (\text{actual } \# \text{ of trading days in month})$$

Naturally, with commodities that are traded but not actually "consumed," such as gold, currency or securities, we must be very careful in the adjustments made. A further complication is that caused by missing or corrupted data, where we are forced to impute one of the observations X_t because it is otherwise unavailable. All sorts of mechanisms may be considered, but a simple average or linear interpolation will usually be adequate:

$$X_t = 0.5 \times (X_{t-1} + X_{t+1})$$

From now on, let us assume that the series X_t , $t = 1, 2, \dots, T$ is recorded correctly and completely, and has been adjusted for any effects that may mislead our analyses. It is now our job to find mathematical models that fit or "explain" the patterns in the data. We will consider two very simple, yet quite effective models for doing this: smoothing and decomposition.

The smoothing model assumes that the actual data is making random excursions from some steady or smooth variation. The simplest model assumes that there are random fluctuations about a single fixed value. We can therefore compute the average or mean of the series and use it for a forecast of future values of the series. Of course, few time series are stationary, that is, have no long term trend. We could improve our forecast—the mean—by updating it with new information (new data points) as they become available. Thus if we start with n points and have the average

$$M(n, n) = \left(\sum_{j=1}^n X_j \right) / n$$

as a forecast for X_{n+1} , it is obvious that once X_{n+1} is observed, it should be added into the average

$$M(n+1, n+1) = (n * M(n, n) + X_{n+1}) / (n+1)$$

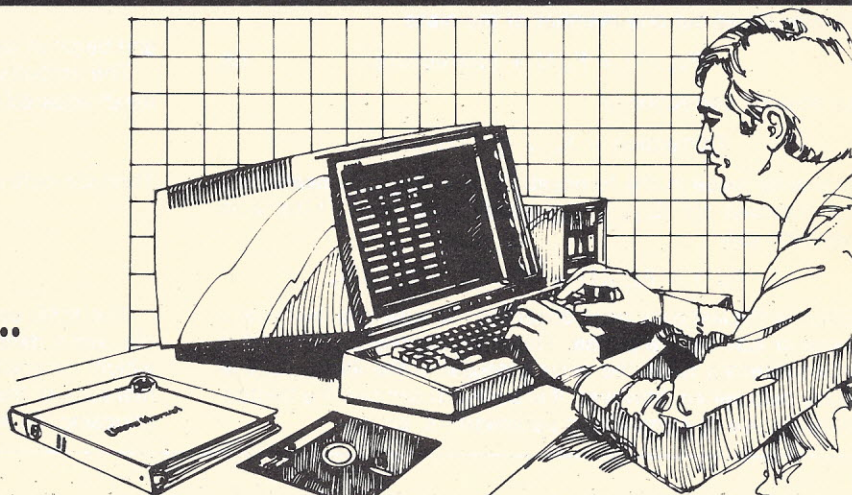
If the series actually has a trend, we may wish to drop some points from the average and use only the latest k points (e.g. $k = 5$)

$$M(k, n) = \left(\sum_{j=0}^{k-1} X_{n-j} \right) / k$$

The update when X_{n+1} is available is then

Condor 4th generation database software obsoletes compilers!

Series 20 relational database management system makes your personal/business computer far simpler to use and much more useful to own... for less money... than other software.



Plain English, no computerese.

Series 20 relational database management is a complete development and operation system. It eliminates BASIC, PL-1, COBOL, FORTRAN, or other compilers in most instances. It allows you to deal directly with your information without complex code words. In plain English, *it lets you manage your business instead of your data.*



Save 90%. Because no complex programming is needed, Series 20 saves up to 90% of the cost of program writing and testing! You also eliminate costly and time-consuming programmer "talent searches."

State-of-the-art relational format.

Series 20 makes traditional programming approaches using compilers *obsolete*. Features such as DEFINE, ENTER, SORT, POST AND REORG permit rapid database creation, access, control, monitoring and manipulation. For instance (by using the JOIN command), you can combine the information contained in two large file cabinets—such as "Purchases" and "Labor Cost"—into a single file—in one operation. To do the same task, ordinary software usually requires substantial reprogramming.

Easiest to learn and use.

Independent evaluators rate Condor Series 20 more "user-friendly" than

any other personal/business computer database system.

After a brief study of the manual, you start building a database *within 15 or 20 minutes*. In fact, *Condor has allowed many hundreds of first-time users to produce and process their own management reports.*



Only \$295 for entry level.

Series 20's three-level modular design provides *full upward compatibility*, up to the most powerful software of its kind in the industry. The entry level Series 20-1 features database file development and management; entry, update and posting; inquiry and report writing capabilities; and complete operations aids. And as information needs grow, you can easily upgrade by simply adding the 20-2

relational features for processing multiple database files, and the 20-3 for elaborate report writing and fast-query indexing.

Condor Series 20 DBMS is the most *complete* system, with *almost limitless applications*...from General Ledger and Accounts Receivable to Credit Assessments and Contract Management.

CONDOR'S 4th GENERATION SOFTWARE...THE INDUSTRY STANDARD OF TOMORROW, AVAILABLE TODAY!

Questions? See Series 20 at your local software dealer, or call Condor at (313) 769-3988.

condor

COMPUTER CORPORATION

P.O. Box 8318, Ann Arbor, MI 48107

I want to manage my business data more effectively *immediately*. Send the following at once.

- ☐ Condor Series 20 Manual containing full information and complete operating instructions, @ \$35.
- ☐ Condor Series 20-1 software package which includes database file development; entry, update and posting; and inquiry and report writing operations @ \$295.
- (In Mich. add 4% sales tax, in Minn. add 5%, in Calif. add 6%.)
- For postage and handling:
In U.S., add \$2.00 per system for regular UPS. International, add \$11.50 per system for Air Printed Matter.

The Condor System requires: Z80 or 8080/8085 microcomputer with at least 48K operating with CP/M® or CDOS.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

My Computer is a _____

Diskette Size _____ 5 1/4" _____ 8"

☐ VISA ☐ MasterCard

Cardholder's Name _____

Card Number _____

Card Expires _____

VISA/MasterCard Bank Number _____

Signature _____

$$M(k, n+1) = (k * M(k, n) + X_{n+1} - X_{n+1-k}) / k \quad (1)$$

$$= M(k, n) + (X_{n+1} - X_{n+1-k}) / k$$

$M(k, n)$ gives the moving average of the k most recent values at point n . It is used as a forecast for X_{n+1} , so let us call it $F_n(1)$, the forecast made at point n for one time period ahead. Likewise, $F_n(3)$ is the forecast made at point n for three periods ahead, that is, a forecast for X_{n+3} . Equation (1) can now be considered as a forecast updating formula:

$$F_{n+1}(1) = F_n(1) + (X_{n+1} - X_{n+1-k}) / k \quad (2)$$

This requires us to "remember" at least k data values. An alternative viewpoint to moving averages is to regard this formula (2) as but one member of the class

$$F_{n+1}(1) = F_n(1) + (\text{correction}) \quad (3)$$

An obvious correction is

$$\text{Correction} = X_{n+1} - F_n(1) = e_{n+1}$$

(the error made in the forecast). In practice, this means that our forecast for X_{n+1} is (by substitution of $n-1$ for n in equation (3))

$$F_n(1) = F_{n-1}(1) + (X_n - F_{n-1}(1)) = X_n$$

which is the last data value observed - for example, last year's sales or last week's prices. This last observation forecast is often referred to as the naive forecast in the literature. For noisy data series, however, it is better to dampen the fluctuations by use of a smoothing parameter, s , so that

$$F_n(1) = F_{n-1}(1) + s * (X_n - F_{n-1}(1)) \quad (4)$$

$$= (1 - s) * F_{n-1}(1) + s * X_n$$

This is called simple exponential smoothing. It has the obvious intuitive meaning (from equation (4)) that we include a portion of the previous forecast and a portion of the latest data value in computing the next forecast. The name is less obvious, and I refer interested readers to books on forecasting or time series analysis for an explanation. In evaluating formula (4), we need a parameter, called the smoothing parameter, which has been labeled s . Incidentally, we also need a first forecast value to start things off, but usually it is sufficient to use

$$F_1(1) = X_1$$

and begin at data point 2.

The smoothing parameter, s , is chosen by computing the mean squared error (MSE) of the forecasts. Recall

$$e_t = (X_t - F_{t-1}(1))$$

Then we define the MSE of the m last forecasts to be

$$\text{MSE} = \left(\sum_{j=0}^{k-1} e_{t-j}^2 \right) / k$$

The MSE can be calculated for different values of s over the same data and the same value of s chosen to be that which minimizes the MSE. The mean squared error is a measure of the lack of "fit" of the forecasts to the data, so choosing the smallest MSE is equivalent to obtaining the best

t	X_t	Z_t $= (X_t - X_{t-1})$	Y_t $= (X_t - T_t)$	S_t $= (Y_t + Y_{t+12})$	e_t $= (Y_t - S_t)$	5-point moving average of e_t
1	394		-13.7	-83.9	70.2	...
2	167	-227	-255.5	-240.7	-14.8	...
3	358	191	-79.3	-128.5	49.2	46.9
4	365	7	-87.1	-132.3	45.2	42.1
5	489	124	22.2	-62.5	84.7	41.5
6	593	104	111.4	65.2	46.2	32.6
7	691	98	194.6	212.4	-17.8	21.2
8	659	-32	147.8	143.1	4.7	10.9
9	546	-113	20.0	31.8	-11.8	19.2
10	691	145	150.2	117.1	33.2	29.2
11	703	12	147.5	59.8	87.7	14.2
12	621	-82	50.7	18.5	32.2	19.5
13	431	-190	-154.1	$= S_1$	-70.2	3.1
14	374	-57	-225.9	$= S_2$	14.8	-23.5
15	437	63	-177.7	$= S_3$	-49.2	-46.9
16	452	15	-177.4	$= S_4$	-45.2	-42.1
17	497	45	-147.2	$= S_5$	-84.7	-41.5
18	678	181	19.0	$= S_6$	-46.2	-32.6
19	904	226	230.2	$= S_7$	17.8	-21.2
20	827	-77	138.4	$= S_8$	-4.7	-10.9
21	747	-80	43.6	$= S_9$	11.8	-19.2
22	802	55	83.9	$= S_{10}$	-33.2	-29.2
23	705	-97	-27.9	$= S_{11}$	-87.7	...
24	734	29	-13.7	$= S_{12}$	-32.2	...
Sum:	13,865	340			0.0	

$$\text{Average } X_t = 13865 / 24 = 577.7$$

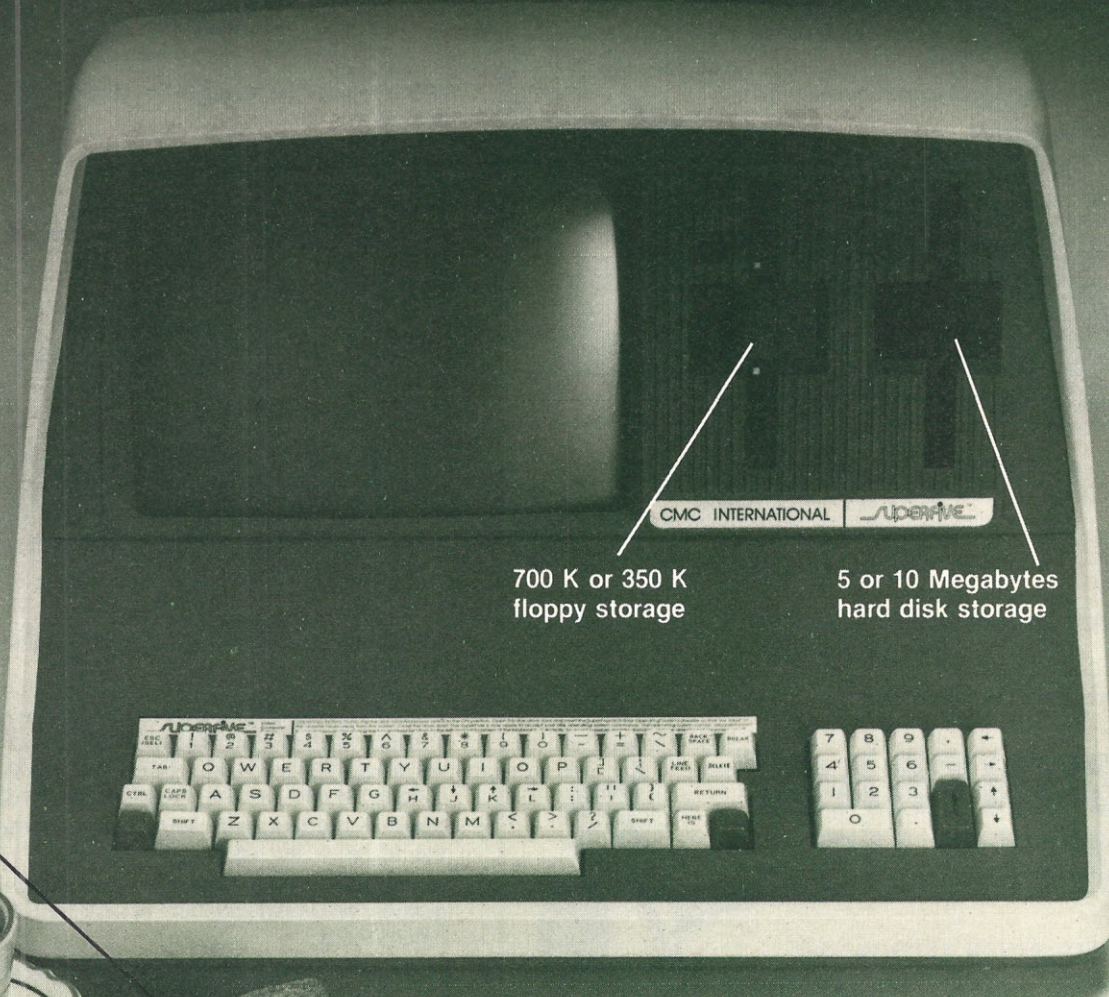
$$\text{Average } Z_t = b = 340 / 23 = 14.783$$

$$\text{Intercept} = a = -12.5 * b + X_{\text{average}} = 392.93$$

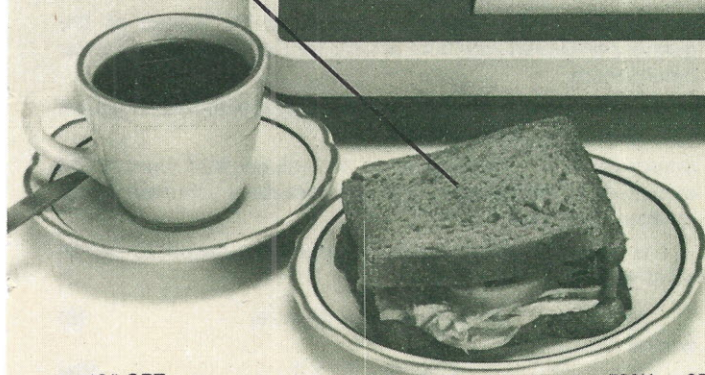
$$\text{Trend line} = T_t = a + b * t = 392.93 + 14.78 * t$$

Figure 1. Calculations involved in decomposition

Grab a byte at the 5 & 10



12 bites, unless
you're in a hurry



5 or 10 Megabytes in a desk-top micro

If you need 5 Megabyte capacity grab our **SUPERFIVE**.
Grab our **SuperTen** for 10 Megabytes and join the
hundreds of users world-wide.

- 12" CRT
- 5 or 10 Mbyte (formatted) 5 1/4" Winchester type hard disk
- Complete and ready to run with CP/M™ 2.2

- 700K or 350K floppy disk back up
- Dual Z-80A processors with 64K RAM
- 4 MHZ Clock frequency

- Dual RS232 ports
- Full ASCII keyboard, numeric pad, user-programmable function keys

CMC INTERNATIONAL

A Division of Computer Marketing Corporation

10058 Main • Suite 220 • Bellevue, WA 98004 • Phone (206) 453-9777 • Telex: 152556 SEATAC

Call or write for the dealers nearest you. Call Toll-Free 1-800-426-2963

CIRCLE INQUIRY NO. 14

Distributed by:

Compu Data
1 Bala Cynwyd Plaza
Bala Cynwyd, PA 19004
(215) 667-6843

Diversified Data
8043 W. 82nd
Indianapolis, IN 46278
(317) 253-5878

Input SRL
Chile 1830
1227 Buenos Aires, Argentina
Telex: 9191 FINCO

Featherbed (Pty.) Ltd
156 Main Reef Road
Johannesburg, South Africa

Dialog Computer Treuhand
Seeburgstrasse 18
6002 Luzern
Switzerland
Telex: 72227 DCL

Single Board Computers	Bare Board	Kit	Assm.
80-153 1k RAM 2k EPROM	\$19.95	\$ 89.95	\$110.95
80-280 1k RAM 2k EPROM	\$19.95	\$119.95	\$129.95
81-260 2k RAM 4k EPROM	\$39.95	\$149.95	\$199.95
81-030 4k RAM 16k EPROM	\$89.95	*\$249.95	\$349.95
8085 3 chip system	\$24.95		
8088 5 chip system	\$29.95		

Apple II boards	Bare Board	Kit	Assm.
79-295 Parallel I/O	\$19.95	\$59.95	\$ 69.95
81-132 A-D 16 Channel	\$29.95	\$69.95	\$ 89.95
80-085 12k EPROM (2716)	\$39.95	\$49.95	\$ 59.95
80-244 EPROM PROGRAMMER	\$24.95	\$39.95	\$ 49.95
80-144 Display add + data	\$25.95	\$42.95	\$ 49.95
80-297 Parallel Printer Interface		\$69.95	\$ 79.95
Extender Board		\$12.95	
81-088 Speech Synthesizer (Votrax SC-01)			\$139.90

Other Products	Bare Board	Kit	Assm.
CRT Controller	\$39.95		
79-287 A-D and D-A	\$19.95	\$59.95	\$ 79.95
79-282 S S Switch 1 ch.	\$ 6.95	\$10.95	\$ 13.95
79-282 S S Switch 4 ch.	\$24.95	\$39.95	\$ 49.95
80-160 + 5 Volt 500 Ma.	\$ 8.95	\$16.95	\$ 20.95
80-161 ± 12 Volt 120 Ma.	\$ 8.95	\$18.95	\$ 22.95
81-120 Parallel Input Speech Synthesizer			\$149.90

Send for complete Catalog and OEM pricing.
*Partially Populated price.

JOHN BELL ENGINEERING, INC.

ALL PRODUCTS ARE AVAILABLE FROM JOHN BELL ENGINEERING
P.O. BOX 338 • REDWOOD CITY, CA 94064
ADD SALES TAX IN CALIFORNIA
ADD 5% SHIPPING & HANDLING • 3% FOR ORDERS OVER \$100
10% OUTSIDE U.S.A.

SEND FOR CATALOG (415) 367-1137

CIRCLE INQUIRY NO. 13

CONTRACT WITH US

CONSTRUCTION ACCOUNTING
SYSTEM... CHECK THESE FEATURES:



- ☒ General ledger system
- ☒ Job cost & project management system
- ☒ Payroll with complete reports
- ☒ Bid document processor
- ☒ Subcontractor management system
- ☒ Trial balance report
- ☒ Income statement
- ☒ Balance sheet
- ☒ Workman's compensation reports
- ☒ Easy 1099 preparation
- ☐ If you want to see the rest of the features contact your local Apple Dealer.

CMA
MICRO COMPUTER DIVISION

CHARLES MANN & ASSOCIATES
55722 Santa Fe Trail
Yucca Valley, CA 92284
(714) 365-9718

CIRCLE INQUIRY NO. 58

38 INTERFACE AGE

fit of the model to the data. This criterion of fit is widely used in many modeling efforts, and is not confined to forecasting.

When there is long term trend in the data, this should be removed before smoothing is applied. Trend is easily accounted for by differencing the series. That is, if X_t is the original data as adjusted for trading days, etc., we form the new series

$$Z_t = X_t - X_{t-1}, t=2,3,\dots,n$$

The average increment from time period to time period in the series X is then

$$b = \left(\sum_{t=2}^n Z_t \right) / (n-1)$$

which yields the straight-line approximation to the original data as

$$X_t \approx a + b \times t$$

where a is the intercept parameter that may be calculated from the mean value of X_t via averaging of both sides of the last equation:

$$a + (n+1) \times b / 2 = \left(\sum_{t=1}^n X_t \right) / n$$

or

$$a = X_{\text{average}} - b \times (n+1)/2$$

Note that $t = (n+1)/2$ is the middle time period of a series of n points. This is illustrated in the examples at the end of the article. The smoothing formulae are then applied to the (hopefully) stationary series of new values

$$Y_t = X_t - a - b \times t \quad (5)$$

which is again illustrated in the examples at the end of the article.

What we have computed in equation (5) is an expression of the time series values with the trend line removed. We could consider further decomposition of the time series. Typically, we would like our model to include trend, seasonality, long-term cycle and random components. We define these as:

trend — the long-term increase or decrease in the value of the values of the observed quantity;

seasonality — the regular variation of the values of the quantity observed with time of year (or day of week, or similar time period);

cycle — long-term regular up and down movement of values that cannot be called seasonal;

randomness — the variations in values that cannot be explained by this model, and are therefore assumed to be random fluctuations.

The decomposition is most easily considered to be an additive one

$$X_t = T_t + S_t + C_t + e_t \quad (6)$$

where

$$T_t = a + b \times t \quad (5a)$$

is the trend component and S_t , C_t and e_t are seasonal, cycle and random components, respectively. In practice, it is more common to use a multiplicative model

$$X_t = T_t' \times S_t' \times C_t' \times E_t$$

where the prime (') has been added to accent the fact that the components have very different values from those in the additive model and the factor E_t is no longer a residual. The widely used decomposition programs from the U.S. Bureau of the Census known as $X-11$ are reported to employ a multiplicative model. However, for simplicity, an additive model is used here.

How are the components evaluated? We have already seen how to get the trend by averaging a differenced series.

APRIL 1982

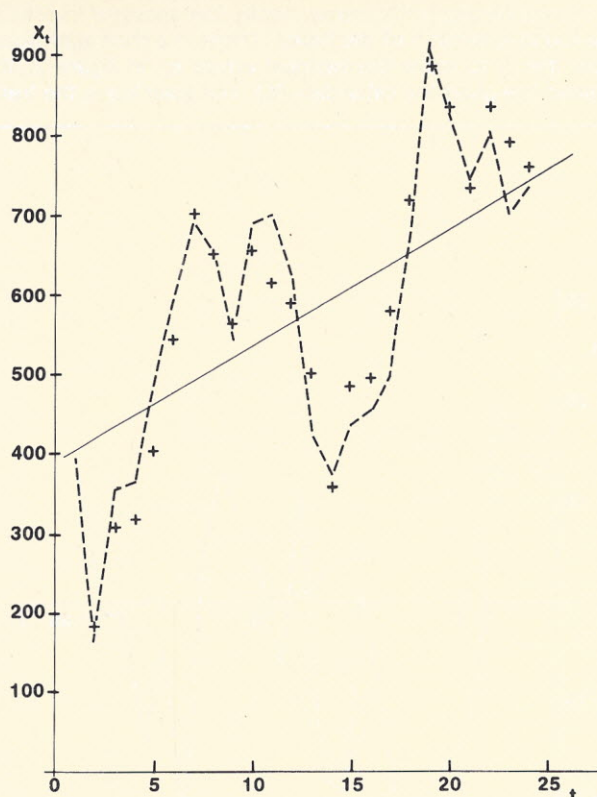


Figure 2. Decomposition of a time series (dashed line) as the sum of a trend line (solid line) and seasonal indices (figure 3). The model values are given by the plus signs (+).

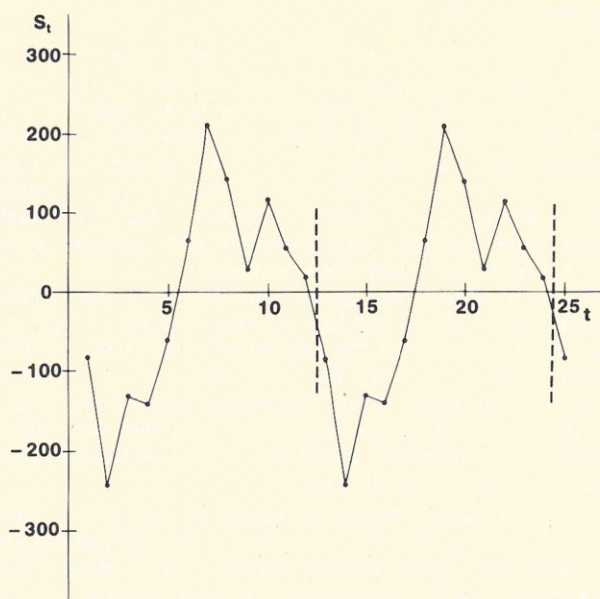


Figure 3. Seasonal indices for the time series presented in figure 2. Note that the pattern repeats every 12 periods.

STARTING YOUR OWN MICROCOMPUTER BUSINESS

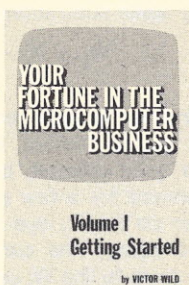
Starting your own microcomputer business is easy if you know the right steps to take. Two volumes of the new book **Your Fortune In The Microcomputer Business** describe the things you should know to start right and to build your business successfully.

Many people have good ideas for a successful microcomputer business. But they don't know how to put their ideas into action. These people are plenty smart. That's not the problem. The problem is in knowing simple things: How to analyze the market. How to select the right product or service. How to get enough startup money. How to plan your growth and success. The answers to these problems are not hard to understand. All you need is the right information. **Your Fortune In The Microcomputer Business** gives you the knowledge tools to start right, grow and prosper.

This practical reference manual has no hocus-pocus. It **does not** tell you how to do astrology or dating services. It **does** give you clear, complete, step-by-step instructions on how to get started right and insure your success!

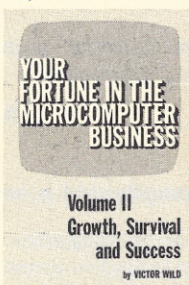
Volume I Includes:

- The hottest trends in the market
- The seven best test markets
- How to read between the lines at a trade show
- 107 ways to reach your market
- Examples of the best ads in the business
- How to get free advertising
- The 21 steps to set up your business
- How to start a manufacturing business
- How to write a newsletter
- How to give a seminar
- How to start a service business
- How to package software for the mass market
- How to be a highly paid consultant
- Franchising—the good, the bad and the ugly
- Interviews with six successful microcomputer businesses
- How to use the RLC factor to be street smart, lean, mean and successful



Volume II Includes:

- Strategies for growth
- Straight facts on incorporation
- How to build your organization
- How to manage cash flow
- How to develop your accounting system
- How to manage employees, wages and salaries
- How to survive a cash crunch
- What to do if things get really bad
- How to maximize your profits
- How to grow by acquisition
- How to value your business
- How and when to sell your business



WRITE OR CALL—DON'T WAIT!

Wildfire Publishing, 326 DB Toro Canyon
Carpinteria, CA 93013 Ph. (805) 684-1489

Please send the following book(s) by return mail. I understand if I want to return them for any reason within 90 days of receipt, I can do so and get a prompt full refund.

☐ **Your Fortune In The Microcomputer Business**
Vol. I, Getting Started, \$20.00.

☐ **Your Fortune In The Microcomputer Business**
Vol. II, Growth, Survival and Success, \$20.00.

Please add \$1.50 per book for shipping, Calif. residents please add \$1.20 each sales tax.

Name

Street

City State Zip

Enclosed is ☐ or charge my MasterCard ☐ or Visa ☐

Card #

Ex. Dt. MCInterbank #

Signature © 1982 Wildfire Pub.

Another way is to use simple least squares regression to calculate a trend line. Then, by subtraction as above, we have the new series

$$Y_t = X_t - T_t = S_t + C_t + e_t$$

The next component to be found is the seasonality. This is relatively straightforward if we know that the observed time series has some cause to be periodic. For instance, usage of home heating fuel in Canada will obviously increase in the winter months. When such patterns are not obvious from prior considerations or by inspection of plots of the data, so that the length L of the seasonality in time periods can be determined, we may choose to consider the series as non-seasonal and set the value of S_t as 0 in our model for all values of t . However, to illustrate the process, consider that we have a monthly series with annual pattern. That is, the length of seasonality, L , is 12. The seasonal components are then expressed as a set of 12 values, one for each month of the year. To get the January value, we average all values of Y_t that correspond to January; for February, all February values, and so on. Note that we have the obvious result

$$S_{t+12} = S_t$$

By again subtracting, we obtain

$$W_t = Y_t - S_t = X_t - T_t - S_t = C_t + e_t$$

Finding the cycle requires careful examination of the W values or graphs thereof. Expressing the cycle mathematically may be quite difficult, but fortunately we only wish to project it forward for a few periods for our forecasting purposes and can do this by eye and hand quite well. To help in visualizing the cycle, one can apply a moving average or smoothing formula to the W_t series. In doing this with a moving average, it is a good idea to attribute the value obtained from the averaging process to the middle time point of those averaged. For example, if five points are used in the averages, we assign

$$C_t = (W_{t-2} + W_{t-1} + W_t + W_{t+1} + W_{t+2}) / 5 \quad (7)$$

The residual random component is then calculated by a final subtraction

$$e_t = W_t - C_t = X_t - T_t - S_t - C_t \quad (8)$$

Complicated procedure

Most production program codes extend the process just presented to transfer some weight between the components in small amounts until the "fit," as measured by the mean squared error (MSE) and other criteria, is satisfactory. While these processes are largely heuristic, the details are complicated—both in procedure and justification, and the documentation can be voluminous.

How do we forecast with such a decomposition model? Quite simply, each component is forecast individually, and these values are then combined to give a value for the forecast of the original series at some time point. The trend is extrapolated by substituting an appropriate value for t in equation (5a). The seasonality is fixed as well by the value of t . We only need to work out which month (season, week, quarter, etc.) t corresponds to. The cycle is extrapolated graphically if no mathematical expression is available, and for most applications this suffices. The random component is taken as 0—our best guess for this unpredictable part of the variation of the time series. Thus, if T is the last time point for which there is an observation, the m period ahead forecast is

$$F_t(m) = a + b * (T + m) + S_{(T+m)} + C_{(T+m)} \quad (9)$$

Decomposition is illustrated in figures 1-3. the raw data (x_t) is differenced to give the series Z_t , which is averaged to

compute a trend line at the bottom of the table. The trend is then subtracted from the data to give a new (stationary) series Y_t in the fourth column of the table. By averaging elements of Y_t corresponding to the same month, the seasonal indices S_t are found (column 5 of the table). These are then subtracted from the Y_t to leave the residual errors e_t . In figure 2, the dashed line gives the initial data (X_t). The solid line is the trend

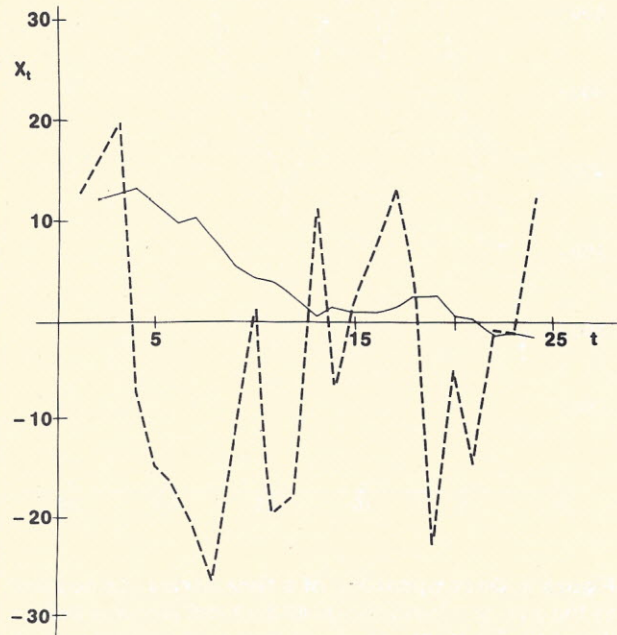


Figure 4. Exponential smoothing applied to a stationary series. ($s = 0.075$).

line T_t , and the plus signs (+) give the model values, that is: $T_t + S_t$. The seasonal indices S_t are plotted in figure 3. Note that the model follows the original data quite well. We could, however, plot the residual errors e_t and would note some pattern, a slow cycle, still present, with a positive weight early in the data and a negative one later. This is also made visible by the five-point moving average of the residual series, which is given as the last column in figure 1.

Figure 4 shows the application of simple exponential smoothing to a series that had the trend removed. Again, the initial data is shown by the dashed line, with the smoothed series given as a solid line. A smoothing parameter of $s = 0.075$ has been used. Interested readers will find it instructive to apply simple exponential smoothing with various values of the smoothing parameter, s , to a stationary series such as either Y_t or e_t of figure 1.

For a somewhat different discussion of forecasting, with a program in Basic to carry out some of the calculations discussed in this column, see the article by Leo P. Biese, M.D., "Forecast: Volume Projection for the Small Business" (IA Dec 79). In order to understand what is going on in the various stages of smoothing or decomposition, however, I strongly recommend coding the formulae and playing with the data. Even if a production code does not result, the experience gained in the process of performing the calculations is valuable when using programs written by others. □

Now... Multi-User, Multi-Tasking Distributed Processing Systems ...at Personal Computer Prices



Now you can utilize the storage capacity, access speed and reliability of Winchester disk technology . . . and the economy and portability of floppy disk systems with the Columbia Data Products' single and multi-user, multi-tasking 1500/1800 microcomputer series.

The 1500/1800 product line provides a complete selection of 5 1/4 and 8 inch floppy and Winchester disks, Z-80A microprocessor architecture, up to 256K RAM and DMA disk controllers. Two parallel ports allow for interface of high-speed peripherals such as printers and expansion storage, and six RS-232 ports give you up to five user stations in a true CP/M® and MP/M® operating system environment. The sixth RS-232 port is available for modems, serial printers or an additional CRT station.

With our new microcomputer series, you can configure your system solution by selecting the terminals and printers best suited for your application based on cost, appearance, performance and such features as intelligence, video attributes, graphics (both black and white and color), and ergonomic factors . . . you need not compromise any longer.

Cost effectiveness, versatility, performance superiority, hardware expandability, and application flexibility are now yours from Columbia Data Products.

And prices start under \$900* list per user . . .

**CALL US FOR DEALER
PROGRAM INFORMATION.**

* Price excludes display terminals and printers.

* Trademark of Digital Research

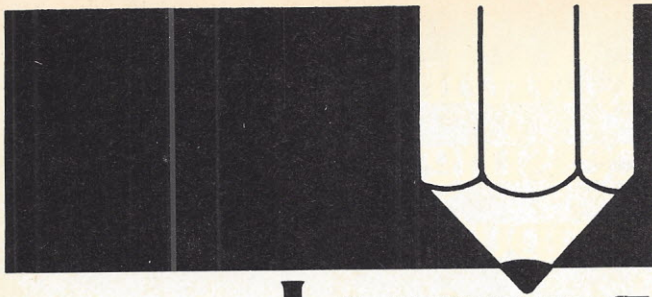
COLUMBIA

DATA PRODUCTS, INC.

Home Office:
Columbia Data Products
8990 Route 108
Columbia, MD 21045
Telephone: 301-992-3400
TWX: 710-862-1891

West Coast:
Columbia Data Products
3901 MacArthur Blvd.
Suite 211
Newport Beach, CA 92660
Telephone: 714-752-5245
Telex: 692 310

Europe:
Columbia Data Products
P.O. Box 1118
4050 Moenchengladbach 1
West Germany
Telephone: 021-61-33159
Telex: 852 452



Learning with Micros

by Louis E. Frenzel, Jr.

IBM in the Educational Market

The introduction of the IBM Personal Computer was probably the biggest event in the microcomputer field last year. Everyone seems to be interested in this machine. I have been giving some thought to the new system, particularly with regard to the impact that it might have on education. My initial reaction is quite favorable.

The IBM unit is among the more advanced personal computers on the market. The heart of the system is Intel's 8088 microprocessor. It features a 16-bit ALU with an 8-bit data bus. It can address up to 1M byte of memory. The capability of processing 16-bit words gives the system an edge in speed and power over most other personal computers with 8-bit processors.

The system comes with 40K bytes of ROM, which contain Basic and other systems programs such as built-in diagnostics. In its smallest configuration, the unit has 16K RAM, which can be expanded to 256K bytes. This is greater memory capability than any personal computer now on the market.

For mass storage, the IBM PC uses a simple audio cassette interface in its minimum configuration. However, I doubt that many people will use the machine in this form. Most users will go for at least one of two possible floppy disk drives, each with a 160,000 character storage capacity. All of this is housed in a single cabinet with power supply. Connected to it by a coil cord is the 83-key ASCII keyboard. As for a display, there are two choices. A user can select the monochrome display containing a high resolution 12-in. green CRT. The format is 25 eighty-column lines with both upper and lower case letters and a variety of special graphics characters. The other display option is a color monitor. With the appropriate color graphics interface and an RGB color CRT, some excellent color graphics can be created.

Finally, the IBM offers only one peripheral option: a dot matrix printer. However, standard interfaces (i.e. RS-232) are available, so that other peripheral devices can be attached.

The initial software offering is somewhat meager as you might suspect for a brand new machine like this. But there is at least enough software to get you started. Basic is contained in the main 40K system ROM. An advanced Basic is also available with the unit's disk operating system. Other software available includes the Peachtree and BPI business and accounting packages, Personal Software's VisiCalc and the Easywriter word processing software.

Overall, the system is well balanced. It contains no major technological innovations, but is more advanced in almost every way than any other personal computer on the market. And the best news of all is the price. While price varies considerably with the configuration, it is quite competitive with the Apple II and III, the TRS-80 and other popular machines. Predictions are that the IBM Micro will become the best-selling personal computer. I think that will also be true in the field of education.

Today many schools are buying personal computers for use in the classroom. Several offer computer literacy programs of some kind. And some schools are using personal computers for actual teaching chores. A lot of CAI lesson material is now available, and teacher-generated exams are becoming more popular every day. However, while many schools are buying personal computers, their use is really not as widespread as might be expected. Many schools have resisted the microcomputer movement because of price or the lack of knowledge about computers and what they can do. As prices drop and as administrators and teachers become more familiar with computers, schools will be buying more computers and discovering their benefits.

It is my opinion that the IBM micro will help this movement. While Apple, Radio Shack and others have sold hard and attempted to educate the academic community, these companies have met with only modest success. It is possible that the schools are resisting these "unknown" manufacturers. While those familiar with personal computers will recognize Apple and Radio Shack as the top micro manufacturers, a teacher in Podunk, KS, is probably asking, "Who are those guys?" But that teacher certainly knows IBM—the name is recognized and respected. I am sure that this familiar and trusted name will encourage more schools to buy computers. A lot of micro industry people believe that IBM's unit has blessed, sanctioned and legitimized the personal computer business.

The IBM system also has a lot going for it in an educational sense, but it also has some problems. The main drawback is that little educational software is yet available. IBM has introduced several educational software packages recently, including Microsoft's Typing Tutor and three mathematics programs developed by Science Research Associates (SRA). While these are certainly not enough to justify the purchase of the IBM system, it does indicate IBM's commitment to education. Teachers simply can't develop their own software, so it is doubtful that the IBM unit will make much penetration into the schools until more software is available. While that's an initial disadvantage, I don't think we will have to wait long before there will be a tremendous flood of software for this machine. Much of the existing software will no doubt be converted to IBM format to get some initial products flowing. Beyond that, many new software packages will be created to take advantage of the unique capabilities of the system.

While educational software can be written in Basic, it would be nice if special educational software were available. Maybe someone will do PILOT for the IBM system. A good authoring language would do a lot toward encouraging the development of CAI.

And maybe the system will stimulate more activity in the adult and industrial education areas. One of the greater potentials for CAI is in the adult continuing education and industrial training fields. With some development software or authoring languages, this could happen faster.

While the IBM micro looks like a dandy for education, it's going to be a while before it really begins to show up in numbers. IBM seems to be production-limited at the present, but I'm sure that will be solved when the demand warrants it. But more important, the Apples and TRS-80s are well entrenched in schools now and there is a tremendous amount of educational software presently available for them. While Apple and Tandy have a big lead, you can expect it to be eroded somewhat as the IBM unit really takes off.

One final note: IBM sells the Personal Computer through its product centers, Computerland stores and Sears business machine stores. Apples and TRS-80s are also sold primarily through computer stores. However, IBM also has a sales force that will sell its units to schools. Other personal computer manufacturers do not typically sell with reps, even though that is the method most familiar to school personnel. With the exception of Heath/Zenith, with its ZDS Z89s, only IBM is taking such an approach. This will be another factor in its successful penetration of the educational market. □

NOW. OASIS-16: STRICTLY BUSINESS.

The 16 bit operating system designed specifically for *business micro-computing*.
Application software?—it's here, NOW!

OASIS-16*: the operating system designed for business. Not just a hobby or development system rewritten for business use, it is the natural evolution of OASIS**: the multi-user system with a world-wide reputation as the standard for those who take business seriously.

And here's more good news: there's no waiting for *application software* because what now runs on OASIS is upward compatible to run on OASIS-16. That means plenty of proven software, available immediately.

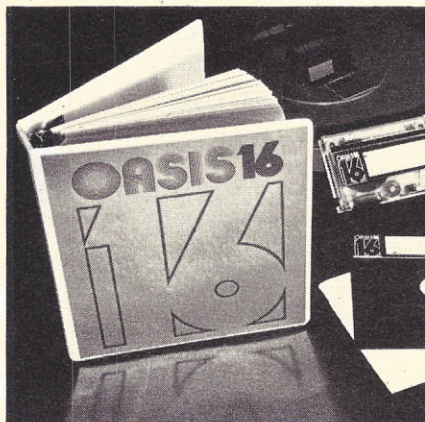
OASIS-16 puts it all in one package. For *manufacturers*: one source for operating systems, languages, tools; custom implementation to maximize hardware potential; international support & training; flexible licensing agreements. For *software developers*: complete portability keeps application software machine independent; integrated tool set makes development easier, faster. For *end-users*: user-friendliness; data security; portability simplifies system expansion; plus an extensive application software library.

Computing professionals have long told us 'OASIS makes micros run like minis'—with OASIS-16, it's truer than ever. And that's strictly good business.

*For 8086, 68000, Z8000, LSI-11, & others.

**For Z80.

THE OASIS-16 PACKAGE CONTAINS: Operating System; EXEC JCL Language; Editor; Script Output Text Formatter; Assembler; Linkage Editor; Diagnostic & Conversion Utilities; BASIC Interpreter & Compiler; 'C' Compiler.



OASIS16
STRICTLY BUSINESS

FEATURES: File & Automatic Record Locking; Logon, Password & Privilege Level; User Accounting; Re-Entrant BASIC Interpreter & Compiler; ISAM, Keyed, Direct & Sequential Files; and more. Plus some of the best, most extensive documentation in the industry.

OPTIONS: COBOL; PASCAL; FORTRAN; RDBMS; 2780/3780 Bsync; Networking; and others.

PHASE ONE SYSTEMS, INC.

7700 Edgewater Drive, Suite 830
Oakland, CA 94621-3051
Telephone 415/562-8085 TWX 910-366-7139

I'm serious about my business—
please send me quick:

- ☐ OASIS-16 Manual, \$75
- ☐ OASIS Manual, \$60
- ☐ Free Application Software Directory and put me on your mailing list.

(Add \$3 for shipping; California residents add sales tax.)

Name _____

St. (No Box #) _____

City _____ State _____ Zip _____

☐ Check enclosed ☐ UPS C.O.D.

☐ VISA ☐ Mastercharge

Card No. _____ Exp. date _____

Signature _____



by Tony Dirksen

Before I started using a personal computer, I could destroy a forest of paper producing even a short article. False starts, misspellings, and poorly-turned phrases created reams of copy destined to incinerators instead of editors' desks.

Both versions also contain a "word processing language" called WPL, which allows the user to automate many word processing functions. It allows you to utilize Apple Writer for specialized needs such as printing files in sequence, creating form letters, automatically transferring files between disks, and replacing strings of words or phrases across multiple files. (All of these programs, incidentally, are included on the Apple Writer diskette and in the manual.)

Since it's built primarily from standard Apple Writer commands, anyone who's learned the main program can immediately begin putting WPL to use. In addition, WPL includes several special features such as variables, subroutines, and the ability to compare strings of words or characters. This allows the user to construct more advanced applications. Because of these programming tools, WPL makes it possible for a user to implement many of the advanced features formerly found only on dedicated word processing systems.

To create a WPL program, you simply enter commands into the Apple Writer text editor the same way you enter text. Each command is on a separate line; the first character of every command represents a standard Apple Writer control character. Additional characters on each line let you make your commands more specific. For example, if you wanted your program to load a file named "magic" from disk drive number 2, you would type:

on the Apple III, and

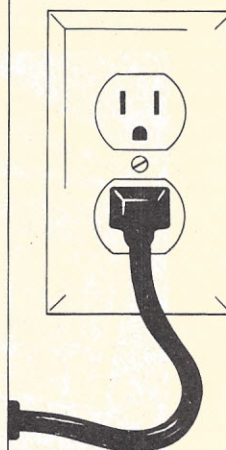
on the Apple II.

The first character on every line is either a space or a label. Labels allow you to create loops so specific tasks can be repeated (such as changing the address on a form letter) while under program control. The new Apple Writer allows you to load and save portions of files, so you can load each address

**FULLY INTERACTIVE, HIGH SPEED CASH REGISTER SYSTEM
FOR THE APPLE II* AND APPLE II PLUS* COMPUTER**

*APPLE II AND APPLE II PLUS ARE REGISTERED TRADEMARKS OF APPLE COMPUTER INC.

VERSA COMPUTING, INC.
3541 Old Conejo Road, Suite 104
Newbury Park, CA 91320
Industrial Strength Software



Your CASHMASTER and APPLE II Computer can be teamed up to streamline your front counter. Sales are quickly rung up with CASHMASTER'S easy to use entry systems. Customers receive a detailed receipt, and you get a complete report on the day's sales activities. Simple, thorough, fast, and flexible, CASHMASTER is also suitable for distributors, wholesalers, and client billing.

Versa Computing, Inc. 3541 Old Conejo Road, Suite 104
Newbury Park, CA 91320 (805) 498-1956

from the disk individually.

The two programs detailed here demonstrate how a WPL program is put together. Both will run on the Apple II or III.

Word.Counter

Word.Counter gives a close approximation of how many words are in an Apple Writer text file. It defines words as "characters between spaces." But it is not able to determine whether those characters are letters or numbers. Basically, the program counts words as the total number of spaces in the story, after accounting for double spaces between sentences and hyphenated words (which are usually counted as separate words).

The new Apple Writer provides a data line along the top row of the screen that shows the remaining memory, total length of the file in memory, your current position in that file, the name of the file and other information. It's possible while working on a file to make a reasonable guess of the total number of words in it by dividing the total file length by five. For closer calculations, however, (for instance, if you're a writer paid by the word), the program gives a far more exact calculation.

This program demonstrates how user input, variables, and program loops work under WPL control. Commentary in parentheses describes what functions are being performed; it should not be typed as part of the program. At first glance, it may all look a bit complicated, especially if you're not familiar with Apple Writer. Many of these, however, are standard program segments that can be repeated as shown here from program to program. In fact, since Apple Writer allows you to link files together, you can keep oft-used program segments on disk and call them up when you need them.

```
START NY
PND
PPR
```

(In Apple II version, the above line is typed "PPR control-V control-L control-V." In the Apple III version, a control-backslash replaces the control-L. The lines clear memory and the screen, and turn off the text display during operation of the program. It's possible—although slower—to display your text while operating the program.)

PPR This program will count the total number of words in a file
PIN Enter name of file : = \$A

(The first line prints to the screen; the second prints and waits for user input. The user input is assigned to one of the four WPL string variables.)

```
PCS/$A//
PQT
```

(The first line examines the user input, comparing it with a string made up of nothing. If the user has input a file name, the program defines the first line as "false" and skips the next line, continuing with the program. If the user is finished (and thus has not input a file name), the program defines the first line as "true" and reads the second line, which tells it to stop operation and return to the text editor.)

```
LOADER NY
L $A
PGO SETUP
PGO START
```

(This section loads the file the user wants to examine. If the file is on the disk, it proceeds to the SETUP label. If the file cannot be found on the disk, the program allows the user to ask for another file name.)

```
SETUP B
PSX 0
```

APRIL 1982

CP/M® SOFTWARE

For The Small Business System

- * HIGH - QUALITY COMMERCIAL GRADE SOFTWARE *
- * DESIGNED FOR VERY HEAVY DAILY OFFICE USE *
- * AUTOMATIC DATA POSTING TO GENERAL LEDGER *
- * RUNS ON FLOPPY-DISK OR HARD DISK SYSTEMS *
- * REQUIRES CP/M WITH 2 DISK DRIVES AND 48K *

INSURANCE AGENCY - FOR INDEPENDENT AGENCIES HANDLING COVERAGES FROM ONE OR MORE CARRIERS. HAS AUTOMATIC POLICY CREATIONS PLUS RENEWALS, INVOICING & POSTING OF COMMISSIONS BY PRODUCER, CARRIER, AND CLIENT. HAS DIRECT AND AGENCY BILLED STATEMENTS ROUTINES, DETAILED ACCOUNTS CURRENT, PLUS MANY OTHER CLIENT AND AGENCY PRODUCTION REPORTS AS WELL AS A POLICY LOSS HISTORY FILE.

MEDICAL MANAGEMENT - FOR SMALL TO MEDIUM CLINICS. PATIENT FILES, CASE HISTORY FILE, AND FULL APPOINTMENT SCHEDULING FILES. HANDLES ICDA-9 DIAGNOSIS CODES AND CPT-4 PROCEDURE CODES WITH STANDARD OFFICE CHARGES. HAS AUTOMATIC MONTHLY STATEMENTS, SUPER-BILLS, AND PRINTING OF AMA INSURANCE CLAIM FORMS AS WELL AS PRODUCTION ANALYSIS, RECALL, INQUIRY, AND OVER TWENTY OTHER REPORTS.

DENTAL MANAGEMENT - SIMILAR TO MEDICAL EXCEPT DESIGNED FOR ADA PROCEDURE CODES AND CHARGES AND ALSO PRINTS TOOTH AND SURFACE ON STANDARD ADA INSURANCE FORM. BOTH SYSTEMS HAVE A FORMS MENU FOR PRINTING ADDITIONAL STATE AND LOCAL INSURANCE FORMS AS WELL AS SPECIAL STATEMENTS.

LEGAL TIME ACCOUNTING - FOR LAW OFFICES. HANDLES CLIENT FILES AND ATTORNEY APPOINTMENT REGISTER. ACTIVE CASE FILES ARE CATEGORIZED BY CASE TYPE, CLIENT, ATTORNEY, CASE NUMBER, AND DATE. HAS AUTOMATIC DEFAULT FOR STANDARD FLAT RATE OR HOURLY CHARGES BY CLASS OF SERVICE WITH MONTHLY ANALYSIS OF TIME SPENT BY EACH ATTORNEY IN EACH CATEGORY. LINKS FOR PRINTING STANDARD LEGAL FORMS & REAL ESTATE FORMS ALSO PROVIDED.

PROPERTY MANAGEMENT - THIS IS ONE OF THE MOST COMPLETE SYSTEMS ON THE MARKET TODAY FOR THE PROFESSIONAL MANAGEMENT COMPANY! ALLOWS COMPLETE HANDLING OF ONE OR MORE GROUPS OF RENTAL PROPERTY OR COMMERCIAL BUILDINGS IN A SINGLE CONSOLIDATED LEDGER WHILE MAINTAINING SEPARATE COST-ACCOUNTING ON EACH BUILDING. HANDLES ESCROW DEPOSITS, MONTHLY STATEMENTS TO RENTERS, AND MUCH MORE.

PLUS ON-LINE ORDER-ENTRY, REAL ESTATE MULTI-LIST, GENERAL LEDGER, ACCOUNTS PAYABLE, ACCOUNTS RECEIVABLE, FINANCIAL ANALYSIS, FULLY INTEGRATED WORD PROCESSING AND SPELLING, DATA BASE MANAGEMENT, AND CP/M FOR TANDY MODEL II !

- * CP/M IS A PRODUCT OF DIGITAL RESEARCH *
- * OPERATOR'S MANUALS AVAILABLE SEPARATELY *

UNIVAIR INTERNATIONAL

10327 LAMBERT INT'L. AIRPORT
ST. LOUIS, MISSOURI U.S.A. 63145

(314) 426-1099

The One Stop Peripheral Repair Center

Independent Peripheral Services is a depot repair facility comprised of qualified technicians ready to solve your maintenance problems.

Floppy Disk Drives Serviced

Memorex	Remex
MPI	Shugart
PerSci	Siemens
Pertec	Wangco

Call Today For A Quote
(213) 991-9440

Two week turnaround
with 90 day warranty on repairs

We Stand Behind The Peripherals We Repair

Independent Peripheral Services
31316 Via Colinas, Suite 101
Westlake Village, CA 91362
(213) 991-9440

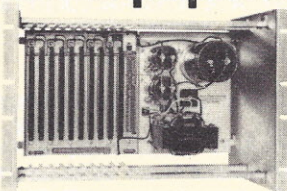
CIRCLE INQUIRY NO. 46

ECTTM



RM-10 S-100 RACK MOUNT CARD CAGE

Building Blocks for Microcomputer Systems, Dedicated Controllers and Test Equipment



ECT's RM-10 is a rack mount 10 slot Card Cage with Power Supply, consisting of an ECT-100 rack mount Card Cage (19"W x 12.25"H x 8"D), the MB-10 Mother Board (with ground plane and termination) all 10 connectors and guides and the PS-15A Power Supply (15A @ 8V, 1.5A @ $\pm 16V$).

\$295.00

ECTTM

Specializing in Quality Microcomputer Hardware
Industrial • Educational • Small Business • Personal
Card Cages, Power Supplies, Mainframes, CPU's,
Memory, I/O, OEM Variations

ELECTRONIC CONTROL TECHNOLOGY

763 Ramsey Ave., Hillside, NJ 07205 (201) 686-8080

(The above lines move the cursor to the beginning of the file in memory, and set the WPL variable X to zero. WPL provides three integer variables.)

```
F/---/ /a
PGO CONT1
CONT1 F/-/ /a
PGO CONT2
CONT2 F/ / /a
```

(These lines automatically survey the file and replace dashes, hyphens, and double spaces—such as those between sentences—with single spaces.)

```
EXAMINE F/ / /
Y?
PGO COUNTER
PGO TOTAL
COUNTER PSX + 1
PGO EXAMINE
TOTAL PIN Total number of words in story "$A" = (X)
(Press RETURN)
PGO START
```

(This section is actually the heart of the program. It finds each space, counts a word by increasing the X variable by one, and returns to look for another space. When it reaches the end of the file, it prints the total number of words and returns to the beginning, so you can examine another file. The actual counting of words can take a few minutes on longer files.)

QUIT PIN End of word count. (Press RETURN)

WPL>Data base

One of the frustrations I've found in the past with using computerized data bases is that they are not linked directly into the word processing program that's normally running on my system. To examine the data base, I have to exit the word processor, boot up the data base program, follow a new command structure to search and edit through the data base, print out the information I want, reboot the word processing program, and type in information from the data base.

This is all very complicated—and, with WPL, unnecessary. I've created a simple WPL-based data base that allows me to maintain a simple records file, using the standard Apple Writer commands to search, add, delete and print records. It certainly does not have the sophistication, sorting capabilities, or program speed of any commercially available data base, but it does allow me to get to the information I want when I want it, using the program command structure with which I'm most familiar. In addition, since it's possible to convert Apple Writer II files into Apple Writer III files and vice versa on the Apple III, I can transport the data base back and forth between the two machines.

(Once again, I've included a few notes in parentheses that should not be included if you input the program yourself.)

```
START NY
PND
PPR
PPR ***** WPL DATABASE *****
PPR
PPR Select from:
PPR
PPR (A) Add a listing
PPR (B) Delete a listing
PPR (C) Search for a listing
PPR (Q) Quit
PPR
PIN Select : = $A
PCS /$A/Q/
PQT
```


PCS /\$A/q/
PQT
PCS /\$A/A/
PGO ADD
PCS /\$A/a/
PGO ADD
PCS /\$A/B/
PGO DELETE
PCS /\$A/b/
PGO DELETE
PCS /\$A/C/
PGO SEARCH
PCS /\$A/c/
PGO SEARCH

(These lines provide a menu of options, and accept either upper or lower case responses from the person using the program.)

ADD PPR
PIN What datafile? = \$B
NY
L \$B
L \$B.Template
PGO QUIT

(These lines load in the datafile, and place a template at the end of it for adding a new listing. The template should be named with the title of the datafile, followed by a period and the word "template," as in "Wine.Template" for a "Wine" datafile. Once you've entered the data into the template, you can save it by typing "control-S" followed by an equal sign, which will save it as part of the original datafile.)

DELETE PPR
PIN Delete from what datafile? = \$B
PIN Delete what listing? = \$C
L \$B
B
F/\$C/\$C/
Y?
PGO QUIT

(This section of the program finds a particular listing within the datafile so you can delete it with Apple Writer commands. After the deletion is completed, you should save the new version of the datafile as described in the "Add" section above.)

SEARCH PPR
PIN What datafile to search? = \$B
PIN Search for what listing? = \$C
L \$B
B
F/\$C/\$C/
Y?

(This section will find the first listing in the datafile that matches your specification. If you want to search from the end of the file, the "B" command should be changed to "E". You can search for additional listings by using Apple Writer's "find" command. As in any data base, developing a good template is critical. You may want to develop a "Search" key in the template—say, a header preceded by the word "SEARCH:"—so you can find the data you want more quickly. If you did that in the above program, you could replace the F/\$C/\$C/ line with F/SEARCH:\$C/SEARCH:\$C/ to help you get to the data you want.)

QUIT PPR

APRIL 1982

SOFTWARE • HARDWARE • SUPPLIES • DISCOUNT PRICES •

THE SMART WAY
TO BUY

CP/M® SOFTWARE

Saving money on software is important. But today's buyer requires added services. Trust STANDARD SOFTWARE for all your micro computer needs!

THE LARGEST SELECTION
IN THE U.S.A.

We have more CP/M Software than anyone!

- All Popular Formats
- Over 200 Applications Available
- Discount Prices • Prompt Delivery
- Emergency Shipments Arranged
- Courteous Salespeople
- Free Technical Support
- 100% Refund if Product Does Not Perform as Documented
- East Coast Distribution Center
- No Shipping Charges on any Multiple Purchase
- Mastercard & VISA Accepted. C.O.D.'s No Problem
- No Additional Fees on Credit Card Purchases
- Purchase Order Accepted from Qualified Corporations
- Hardware Available at Low, Low Prices



CP/M Reg. Trademark of Digital Research.

standard software

CORPORATION OF AMERICA

10 MAZZEO DRIVE, RANDOLPH, MA 02368
617-963-7220
ORDERS ONLY 1-800-343-8420

SOFTWARE • HARDWARE • SUPPLIES • DISCOUNT PRICES •

CIRCLE INQUIRY NO. 79

EARN TOP \$\$\$\$ FOR SOFTWARE SOLUTIONS

If you've programmed a solution to an age-old problem or pioneered a solution to a new one, John Wiley & Sons would like to review your program for possible publication. We're seeking innovative microcomputer programs in business, engineering, science, and home management.

For 175 years Wiley has kept professionals on top of their jobs. Now we're putting our experience and resources into publishing quality microcomputer software.

If you think you can match our standards of excellence, please send your letter of inquiry to Dianne Littwin, Acquisitions Editor, Wiley Professional Software.

1807  1982

Wiley Professional Software
John Wiley & Sons, Inc.
605 Third Avenue
New York, N.Y. 10158

2-1742

CIRCLE INQUIRY NO. 92 INTERFACE AGE 47

THE COMMODORE LOGBOOK



by Mike Heck

VisiCalc Applications

One of the most powerful uses of a microcomputer in business is for financial analysis and planning. The computer can provide an immediate look at the shape of your business and guide your plans for the future.

But financial analysis goes beyond the standard accounts payable/receivable listings and balance sheet statements. "What if?" analysis involves taking existing data and trends, then projecting a new situation based on the original data. You might, for example, wish to see the impact on sales if you lowered the price of a product—exactly what would happen to bottom line figures if costs increased in certain areas.

VisiCalc, by Software Arts, distributed by Personal Soft-

ware, Sunnyvale, CA, is such a forecasting tool. It is just about the best-selling program for microcomputers.

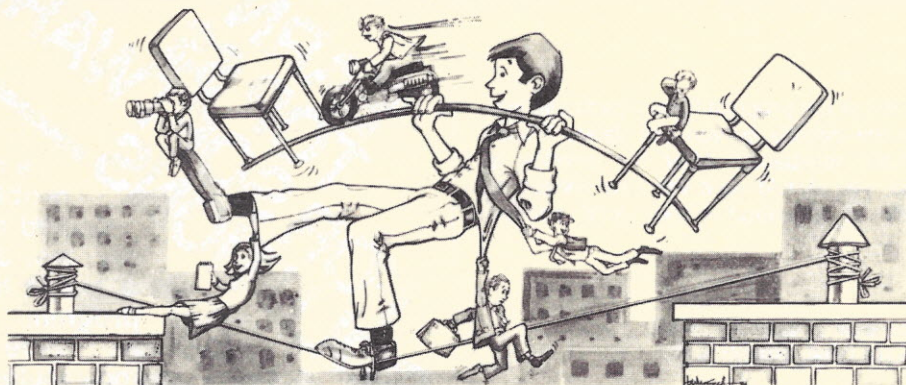
In essence, VisiCalc is an electronic worksheet extending 63 columns by 254 rows. At each coordinate of a row and column, you can "write" in a value, a label/heading, or a formula that refers back to some other coordinate or coordinates. But the recall power of the program is that it will automatically recalculate all the figures on the sheet if you change any entry. This feature lets you effortlessly look at several alternatives as you plan a project. What follows is a brief overview of VisiCalc applications on Commodore equipment.

The standard VisiCalc will operate on any Pet or CBM computer with a minimum of 32K memory. When the program is loaded, it automatically checks to see which computer you are using (either 40- or 80-column) and loads the proper version. Using VisiCalc with a CBM 8032 enables you to use the whole 80-columns to display information. When dealing with a lot of data, this is an important plus. Using VisiCalc on a 40-column Pet is not really a limitation; you just view only half as many columns as the 8000 version.

The one negative to VisiCalc on Commodore equipment is available user memory to hold the work sheet data. VisiCalc itself occupies about 22K of memory, leaving only 10K for data storage. In reality, only modest spread sheets can be constructed in 10K. A way around this is to design your VisiCalc application in sections and save those sections on disk under various names. The drawback to this partitioning technique is that one section can't access data from the other sections very easily.

The answer is an extended VisiCalc designed to work with add-on memory boards available for the Commodore CBM 8032. These boards take many forms and are available from Commodore (64K add-on and internal 64K RAM of SuperPet), a 256K external expansion box (which is available in Europe) and the 64K CP/M Softbox from Lifeboat Associates, New York, NY, to name just a few. The 256K add-on currently sup-

RM/COBOL™1 MAKES IT ACROSS!



**...FROM ONE OPERATING SYSTEM TO ANOTHER!
A VITAL WAY TO PROTECT YOUR SOFTWARE INVESTMENT FOR THE FUTURE!!**

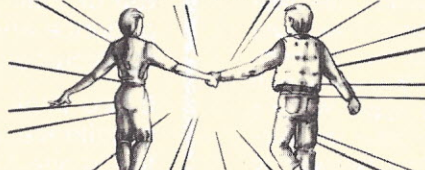
The **RM/COBOL** language runs on more different Operating Systems and more different-sized computers than any other similar language. For starters, it runs on NCR and TI minicomputers and, in the micro field, on the CP/M², MP/M², CP/M-86², MP/M-86², TRSDOS³, OASIS⁴, MOASIS⁴, and UNIX⁵. (ONYX version) Operating Systems...to mention only a few.

Until now, serious business software of the scope and flexibility seen in the minicomputer world has not been available on micros. **RM/COBOL** now allows transfer of such software with a minimum of fuss.

We have participated in such a mini-to-micro transfer of a major set of general business software

...using **RM/COBOL**, as the transfer mechanism, of course. Running on literally thousands of mini-computers, these refined, enhanced, and proven

RM/COBOL, and **RT!™** from **CYBERNETICS** ARE GOING STEADY...



...AND YOU'RE GONNA LOVE 'EM TOO!!

Use your computer to program itself. **RT!** (Cobol Reprogramming Tool!) from Cybernetics is a program generator for **RM/COBOL** that produces error-free **RM/COBOL** source programs for data input, file maintenance, and report printing programs.

A full feature interactive program generator, not a subset! Call Now! 714/848-1922.

software packages cover A/R, A/P, G/L, P/R, Order Entry (with Invoicing and Inventory Control) as well as Sales Analysis. The Packages define a new level of achievement for features and flexibility in micro applications software and offer top quality at a reasonable price.

For immediate information, call 714/848-1922 for your complete product description.

Trademarks of:

1-Ryan-McFarland Corp.; 2-Digital Research, Inc.; 3-Tandy Corp.; 4-Phase One Systems, Inc.; 5-Bell Telephone Laboratories, Inc.; 6-Cybernetics, Inc.



8041 NEWMAN AVE., SUITE 208
HUNTINGTON BEACH, CA 92647
714/848-1922

ports a VisiCalc with 41K free for workspace. You can still do a great deal of work with the 32K version of VisiCalc on either Pet or CBM systems.

When first running VisiCalc, the user is presented with a two-line status area on the top of the screen. Directly below the status area are columns, labeled A through BK. Rows are numbered 1 to 254, and run vertically down the left side of the screen. Naturally, you can only see part of the work area

The relocation feature lets you effortlessly look at several alternatives as you plan a project.

at any time. On an 80-column display, you normally view an 8-column by 21 row area.

Except for a "cursor," which is a reversed bar the width of one column, positioned at location A1 (the upper left-hand corner of the work area), the rest of the display and entire work area are empty. The top status line will also show "A1," indicating the cursor position.

On the right side is another number, usually 10 in the standard program, indicating the amount of memory available for your data. As you enter information, this number will decrease. Use it as a guide in creating your sheet. As it becomes small, 1-2, it's time to think about saving the sheet and starting a new one.

Depressing the "/" key displays "BCDFGIMPRSTVW" on the status line. These are single letter abbreviations for the various VisiCalc commands. For those not familiar with the program, the respective commands are: BLANK, CLEAR, DELETE, FORMAT, GLOBAL, INSERT, MOVE, PRINT, REPLICATE, STORAGE, TITLE, VERSION, WINDOW, and LABEL. VisiCalc also contains a number of built-in functions that will be used extensively. These include the usual arithmetic operators, plus MIN, MAX, COUNT, AVERAGE, transcendental functions and graphing. Let's discuss the commands needed to create the sample sheet presented here.

Using VisiCalc involves entering information on the sheet in the appropriate location. You can position the cursor at any place on the sheet by using the cursor keys on the keyboard. The cursor up/down key moves you vertically through the rows and the cursor left/right moves you back and forth through the columns. You can enter a number or alphanumeric label at any cursor position by simply typing the information and hitting RETURN.

Normally, rows and columns are labeled with headings first, then corresponding information is entered. For example, if the second column is for January and the third row represents sales for the month, you would enter the sales figure at the intersection of the appropriate column and row, in this case B3.

Once information is entered, you will probably want to do some math operations with the data. Using the addition

TERMINALS FROM TRANSNET

PURCHASE PLAN • 12-24 MONTH FULL OWNERSHIP PLAN • 36 MONTH LEASE PLAN

	DESCRIPTION	PURCHASE PRICE	12 MOS.	24 MOS.	36 MOS.
DEC	LA36 DECwriter II	\$1,095	\$105	\$58	\$40
	LA34 DECwriter IV	995	95	53	36
	LA34 DECwriter IV Forms Ctrl.	1,095	105	58	40
	LA120 DECwriter III KSR	2,295	220	122	83
	LA120 DECwriter III RO	2,095	200	112	75
	VT100 CRT DECscope	1,695	162	90	61
	VT101 CRT DECscope	1,195	115	67	43
	VT125 CRT Graphics	3,295	315	185	119
	VT131 CRT DECscope	1,745	167	98	63
	VT132 CRT DECscope	1,995	190	106	72
TEXAS INSTRUMENTS	VT18XAC Personal Computer Option	2,395	230	128	86
	T1745 Portable Terminal	1,595	153	85	58
	T1765 Bubble Memory Terminal	2,595	249	138	93
	T1 Insight 10 Terminal	695	67	37	25
	T1785 Portable KSR, 120 CPS	2,395	230	128	86
	T1787 Portable KSR, 120 CPS	2,845	273	152	102
	T1810 RO Printer	1,695	162	90	61
	T1820 KSR Printer	2,195	211	117	80
	ADM3A CRT Terminal	595	57	34	22
	ADM5 CRT Terminal	645	62	36	24
LEAR SIEGLER	ADM32 CRT Terminal	1,165	112	65	42
	ADM42 CRT Terminal	1,995	190	106	72
	EXCEL 12 CRT Terminal	1,695	162	90	61
DATAMEDIA	EXCEL 42 Smart Buffered CRT	995	96	54	36
	COLORSCAN 10 Color CRT	3,195	307	171	116
	925 CRT Terminal	850	82	46	31
TELEVIDEO	950 CRT Terminal	1,075	103	57	39
	Letter Quality, 7715 RO	2,895	278	154	104
NEC SPINWRITER	Letter Quality, 7725 KSR	3,295	316	175	119
	2030 KSR Printer 30 CPS	1,195	115	67	43
GENERAL ELECTRIC	2120 KSR Printer 120 CPS	2,195	211	117	80
	Executive 80/20	1,345	127	75	49
HAZELTINE	Executive 80/30	1,695	162	90	61
	MX-80 F/T Printer	745	71	42	27
EPSON	MX-100 Printer	895	86	48	32
	TIMEPLEX				
	ED400 4 Channel Stat Mux	1,525	147	82	55
	ED800 8 Channel Stat Mux	2,050	197	110	74

FULL OWNERSHIP AFTER 12 OR 24 MONTHS • 10% PURCHASE OPTION AFTER 36 MONTHS

MICROCOMPUTERS

APPLE • COMMODORE • HP85 • DEC LSI 11

ACCESSORIES AND PERIPHERAL EQUIPMENT

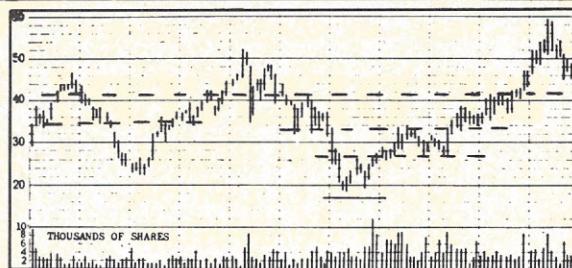
ACOUSTIC COUPLERS • MODEMS • THERMAL PAPER • RIBBONS • INTERFACE MODULES • FLOPPY DISK UNITS



TRANSNET CORPORATION

1945 ROUTE 22 • UNION, N.J. 07083 • (201) 688-7800
TWX 710-985-5485 800-526-4965 OUTSIDE N.J.

CIRCLE INQUIRY NO. 86



THE COMPUTER STOCK MARKET BOOK THE PROFESSIONALS BUY

Purchased by over 160 Financial Institutions, 75 Market Advisory Services, 50 Colleges and Universities, and 150 Computer and Software Firms.

Has been sold in every state and over 30 other nations. It is a study of market timing based on cycles and seasonal factors, as they affect stock and commodity prices. It gives solid tools for measuring and profiting from them. Author has more than 20 years experience as a stock broker, and conducted 8 years of computer research developing the 34 programs in the book which contains ideas and programs never before published. Programs are written in TRS-80 BASIC.

Do you have the great stock and commodity trading advantages given by the home computer to the few who properly use it?

To order "New Uses For The Home Computer In The Stock Market" send your name and address with your check for \$19.95 (overseas; U.S.A. Dollar International Money Order or a Draft payable on a U.S.A. Bank) to:

Thomas V. Lenz, Dept I
596 W. Karval Ct. - Spring Creek
Elko, Nevada 89801

CIRCLE INQUIRY NO. 53

INTERFACE AGE 49

MICROSTAT™ Release 2.0

**NEW
RELEASE!**

Just some of the new features of Microstat Rel. 2.0 include: new programs for moments about the mean, skewness, kurtosis and stepwise multiple regression, longer file names, faster sort routine, the ability to declare each data file's numeric precision and drive location plus an expanded user's manual with new appendices for the equations and file structures used in Microstat. Also included is a Data Management Subsystem for file maintenance (edit, list, destroy, augment, sort, rank-order, move and merge) plus transformations (add, subtract, multiply, divide, reciprocal, log, natural log and antilog, exponentiation and linear) that allow you to create new variables from existing variables.

After file creation with DMS, programs for analysis include: Descriptive statistics, Hypothesis testing (mean and proportion), ANOVA (one-way, two-way, and random blocks), Scatterplots, Frequency distributions, Correlation analysis, Simple, Multiple and Stepwise Multiple Regression (including files larger than available memory), Time series, 11 Nonparametric tests, 8 Probability distributions, Crosstabs and Chi-square, Combinations, Permutations and Factorials (up to one million factorial). All program output is neatly formatted for easy use.

The price for Microstat Rel. 2.0 is \$295.00 and the user's manual is available for \$25.00 (credited towards purchase) and includes sample printouts with file labels that reference standard statistical texts and journals so you can compare the results from Microstat to those produced on much larger systems. Compare Microstat to any other package on the market and we think you'll agree that Microstat is the best at any price.

ECOSOFT, INC.

P.O. BOX 68602
INDIANAPOLIS, IN 46268-0602
(317) 283-8883



CIRCLE INQUIRY NO. 35

WE DELIVER!

**DISK DRIVE REPAIR
YOU CAN COUNT ON
90 DAY GUARANTEE
FAST TURN AROUND**

Data Tech/Reliance, Inc.

**DISK DRIVE REPAIR
& ALIGNMENT CENTER**
31003 18TH AVE. SOUTH
FEDERAL WAY, WA
98003

(206) 941-3296



Authorized Dealer for Persci Disk Drives
Direct To You at Substantial Savings
Mod. #277 \$1535.00 Mod. #299 \$2800.00
Case w/p/s \$345.00

50 INTERFACE AGE CIRCLE INQUIRY NO. 30

function, the sum of all elements in a column can be placed at the bottom of the column with one step. If your costs for the month of January were contained in locations B12 through B24, at location B26 you could type:

@SUM(B12...B24)

Location B26 would immediately display the sum of those 13 entries.

The accompanying sample printout is part of a sheet designed for an advertising agency so it could obtain an immediate view of how the business was going. Because the various elements on the sheet are related in some fashion by placing formulas at various coordinates, changing any cost item will display the effect it would have on that month's profit/loss, and the year-to-date figures.

Fixed costs for doing business are similar for most organizations, even though the names change. Items like salaries, personnel costs, occupancy, travel and general costs such as rent are fairly universal. And every business must have a source of revenue. In most cases it comes from sales. However, advertising agencies rely on a percentage of the gross cost of ads they place for clients as the major source of revenue. This is their commission.

This second section of the sheet that takes the gross billings and converts them into revenue is an extra step that most people would not use. Associated with this second area is a "look-up" table that contains the commission rate for each client. Basically, the sheet is set-up to multiply the figure for gross billings by the corresponding rate to arrive at revenue produced by each client, by month. Eliminating these two sections, and making the revenue section reflect your business, this sample sheet could be customized to fit many situations. Depending on how many entries you want to make in each sub-category and how many months it entails, you should be able to fit this sheet in memory at one time.

If additional space is needed, each cost area could be a separate sheet on disk. However, you lose some flexibility in being able to add up and display bottom line figures immediately. The figures from each category would have to be transferred from each individual cost sheet to a summary sheet that does the final tallying. In creating this sheet, the first thing was to label the columns across the top with the months of the year. The original sheet contains all twelve months. The final column is a total of all rows across any particular month.

The next step was to label the rows with the appropriate title. As mentioned, the specific items used here might not exactly match your unique situation, but you could probably follow the general categories I used. Setting these titles involved nothing more than typing the heading at the right location and using the cursor keys to go on to the next spot.

Improving appearance

A VisiCalc command, "." (the repeating lable), was used to create the dotted lines and other break points. These are optional. However, they do make for a more professional-looking listing. If you have the memory space, it's a good idea to separate things a bit.

Another VisiCalc command, "R" (replicate), was used to reproduce the label across all the rows.

At the bottom of each category, the addition (or SUM) command was used to add up parts of each column. For example, on this sheet the January gross billings for the clients are contained in locations B9 through B18. At location B20, the following was typed to get the month's gross billings:

@SUM(B9...B18)

With the cursor at B20, the replicate command was used to replicate that formula at location C20 through M20. When you use the replicate command, VisiCalc first asks for the source range. Just hit return and B20 will be displayed. Now,

APRIL 1982

the target range will be asked for. You can either type the coordinates of the starting and ending column number or move the cursor to each location and enter the location by hitting return.

VisiCalc next responds with the coordinate B20 highlighted and the prompt "Relative or No change." Hit R for relative. We want the sum at the bottom of column C to reflect the sum of C9 through C18, not figures in column B, and so on. The revised formula is immediately reproduced at location C20 through the ending column specified, relative to each column.

Building the Revenue section

In the sample, the Revenue section was constructed by writing a formula that took the gross billings, multiplied that figure by the corresponding commission rate for each client, then placing the resulting figure in the spot for revenues.

During development, this was the most time-consuming part of the whole project. Each revenue figure had to reflect the proper client in the section above it. The replicate command was used extensively to construct each formula and make it relative to the proper location in the gross billing section, while not changing the commission rate.

Even though many clients have the same commission rate, the look-up table was constructed in this fashion, so the rate for one client could be changed without affecting all others.

For most uses, you would not even go through any of this. A single figure for revenue would be entered in the month column. But it does illustrate an important point. For this client, the calculation of revenue by hand was a real chore. Having the program do it saves many hours and ensures accurate results. Perhaps your business has a unique need that VisiCalc can answer.

In each cost area, the SUM command was used to total the categories by row and column. This was straightforward. The replicate command, once again, made things move very quickly once the initial formula was created.

The Total Expenses row takes the sum of each cost category. The formula is simply:

$@SUM(B55 + B71 + B81 + B95 + B107 + B128 + B130)$

Of course, in your case the coordinates will reflect the location you selected for various categories. The above formula just adds up the sub-totals in each cost category. The replicate command was used again to place this formula in locations C134 to M134, providing total costs for each month. In this case, VisiCalc will ask the "Relative or No Change" question for each entry in the formula. They should all be relative.

The final, and most important row is the Profit/Loss calculation, but it is also the easiest formula. This is merely taking the revenue for each month and subtracting the costs. The formula on this sample sheet is:

$+ B37 - B134$

This is, again, replicated across all columns, relative to each column, to arrive at the bottom line figure for each month and the year.

In actual use, the gross billing figures are entered and VisiCalc automatically does the conversion into revenue. Actual fixed costs are also entered. Profit/loss figures are then instantly displayed, without having to refer to detailed income and balance sheet statements.

But the most important thing is that projections can now be made by changing billing or cost figures. In changing any one, the effect on all others is shown instantly. In planning during these uncertain times, this may be the most important edge you have. It's that simple...and that complex.

By showing a sample VisiCalc sheet that is providing this edge in daily operation, perhaps you'll take a look at how the same thing could apply to any number of businesses, large or small. □

Sample worksheet on page 150

LOOK ON THE BRIGHT SIDE

Inventory Management for Small Computers

Chuck Atkinson

If you own a retail store or work in one, you need this book to cut costs and improve profits. The control program will provide important inventory information, prepare purchase orders like magic, adjust stock when printing a sales ticket, and much more!

ISBN 0-918398-48-7

\$16.95

Instant BASIC, 2nd Astounding! Edition

Jerald R. Brown

This will teach you the fundamentals of BASIC in a clear, non-boring style, with over a gross of mostly quick, often fun and always educational little programming activities to demonstrate statements, functions, and useful techniques.

ISBN 0-918398-57-6

\$12.95

Computers for Everybody

Jerry Willis and Merl Miller

As the title implies, this fun-to-read book covers all the things that you, as a non-technical beginner, should know about computers. If you're anxious to buy one, use one or just want to find out about them, read this book first.

ISBN 0-918398-49-5

\$5.95

WE MAKE COMPUTER BOOKS EASY

Please send me the book(s) I have checked below. I understand that if I am not satisfied, I may return the book(s) for a full refund.

☐ Computers for Everybody ☐ Instant BASIC

I enclose \$_____ plus \$1 to cover handling.

NAME _____

ADDRESS _____

CITY, STATE, ZIP _____

☐ Inventory Management

☐ Please send me your catalog—BRAIN FOOD.

dilithium Press
P.O. Box 606
Beaverton, OR 97075

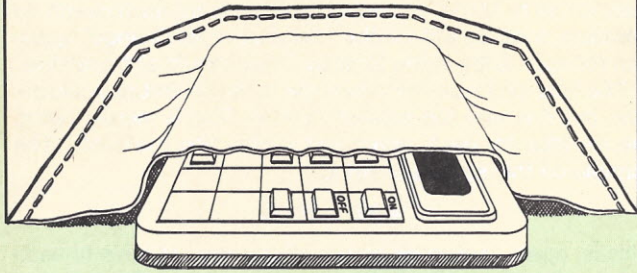
dilithium Press

P.O. Box 606
Beaverton, OR 97075
800-547-1842

Call for store nearest you
that carries our books.

POWER IN YOUR POCKET

by Bob McElwain



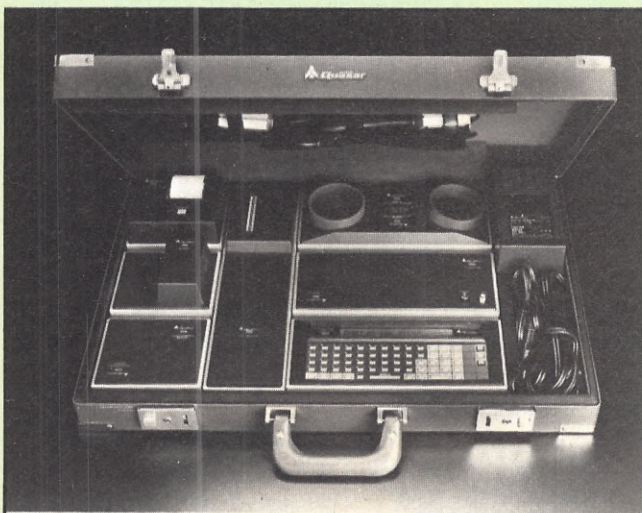
A Peek at the Panasonic

It's here! I saw a Panasonic handheld computer just the other day. And it works. (Panasonic and Quasar are both built by Matsushita of Japan and differ only cosmetically.) At the time it was the only machine in Los Angeles, but I was assured more would be here soon. I did not have an opportunity to work with the unit. However, I was able to talk with someone who had.

Gene Sprouse is the President of Rainbow Computing, Northridge, CA. He got started in the retail computer business when micros were new. In this extremely competitive environment, he's built a very successful business. He's working with Apple computers supporting solid business systems, while maintaining a heavy interest in personal computing.

The configuration I saw consisted of the computer, add-on memory, modem, RS-232 interface, video interface, and printer. Assembled in a slim-line briefcase, this configuration will retail at approximately \$2,000.

At present, the computer holds four 2K ROMs, easily interchangeable, that permit the use of canned software. The ROMs will soon be 4K each, giving a total of 16K program space in the computer itself. 8K chips are expected that will give 64K. The external memory module is presently 8K and will soon be 16K. Several such modules can be added. The computer itself is roughly an inch taller and longer than a pocket computer and a little more than twice as thick. It's



The Quasar HHC with peripherals, including a memory module, RS-232 interface, thermal printer, modem and video interface.



Quasar model

powered by NiCad batteries that should operate for six or more hours without recharging.

Sprouse feels this computer is in many respects faster and more powerful than the Apple. (They both use the same processor chip, the 6502.) He's particularly impressed with the engineering and performance. Careful thought has preceded the production of this computer. For example, you can disconnect any component of the system at any time without destroying information or damaging the system in any way. The computer beeps politely if it needs anything, even a battery change.

Sprouse believes the initial applications of this computer will be data acquisition. The computer will be used in the field to gather a variety of information. This data can be transmitted to a central site from any telephone. Or the unit can be brought to an office and connected to available peripherals for processing. Extensive efforts are being made to implement such applications as soon as possible. In short, Sprouse is very impressed. He sees a bright future for Panasonic and plans to be a part of it.

Some reservations

I'm not as excited. I was looking for the highly touted personal computer announced some time ago. As a business system, the Quasar/Panasonic can be significant. (Lack of application software will hold it back for now.) As a personal computer, Quasar/Panasonic does not make it. Although, powerful, it's expensive and does not lend itself to personal use.

It's designed to run canned software. Personal tinkering is not encouraged by system design. For example, there is no inexpensive way to develop your own software. In order to save a program, you'd have to dump to high speed cassette, use a modem to another computer or wait for a disk drive to become available.

Most people will use software burned in ROM. These chips are likely to be priced closer to \$100 each, rather than \$50. Even a modest library of programs could cost a lot of money.

Another highly advertised personal application is the use of the modem in order to communicate with various data nets. A video interface gets around the problem of the single line that can be displayed directly on the computer. However, the use of this computer in this mode seems contrived. Much less expensive systems are available that interface with data nets more effectively than this system can.

Whatever success is headed for this new computer, it will begin with data acquisition and other business applications. Personal applications will be limited. It seems highly unlikely that people will buy this system as a personal computer. The price is high and software is higher. People with personal computing needs will acquire inexpensive and handheld computers and small micro systems designed to treat them kindly.

Table 1: Data with 3, 5 and 7-day moving averages

PER #	1	2	3	4	5	6	7	8	9	10	11	12	13
DATA	8.17	2.24	1.42	8.24	2.36	4.17	5.07	3.77	4.68	5.74	4.83	6.84	5.97
PER #			1	2	3	4	5	6	7	8	9	10	11
3-DAY AVE	—	—	3.94	3.97	4.01	4.92	3.87	4.34	4.51	4.73	5.08	5.80	5.88
PER #					1	2	3	4	5	6	7	8	9
5-DAY AVE	—	—	—	—	4.49	3.69	4.25	4.72	4.01	4.69	4.82	5.17	5.61
PER #							1	2	3	4	5	6	7
7-DAY AVE	—	—	—	—	—	—	4.52	3.90	4.24	4.86	4.37	5.01	5.27

Moving or rolling averages

Suppose you're tracking gross sales daily (or commissions, stock quotations, etc.). You probably jot down the day's figures and consider the resulting sequence in a number of ways. Patterns are not always clear. Consider the following set of data: 1-8.17 2-2.24 3-1.42 4-8.24 5-2.36 6-4.17 7-5.07 8-3.77 9-4.68 10-5.74 11-4.83 12-6.84 13-5.97.

The trend to this set of data may not be obvious. A moving or rolling average is often helpful. In table 1, moving averages for 3, 5 and 7-days have been computed for the above. These averages clearly show an increase of approximately 20%. A moving average tends to smooth out peaks. This smoothing is what brings a trend into focus, if any trend exists.

The average tends to lag behind current data, below or above, depending upon whether the trend is up or down. The greater the number of periods averaged, the greater the lag. One of the classic signals of trend reversal occurs at the point the plot of the current data crosses that of the trend line.

To use the notion of trend-line crossing, it's useful to explore the number of periods averaged. For some data and certain applications, a three-day average is best. For others, a longer period is better.

The program below provides three options with which to explore moving averages on a set of data. With the edit option, data can be edited or entered as needed. In this section, a "number of periods to be averaged" can be set to be used in the "Add Data" segment.

When data is added, the last N-day average is computed, using N periods as established in the edit segment. Data is added without changing previous data until the array is full. Thereafter, data is rolled back one period (the earliest item is discarded) and the new data inserted in the last position in the array.

Another segment, Run Aves, provides for examining the data with varying numbers of periods averaged. This allows selection of the N-day period that seems to best suit the data and application.

As listed, the program leaves room for 54 data items. Much of the code is to assure accuracy of entry and procedures. I personally make lots of mistakes and need a forgiving system. Further, since I don't use the program often, I need directions in the code. If you need room for more data, much of this code can be deleted. As written, the PRINT statements are necessary if a printer is used. Here are the lines that can be deleted easily, with required changes for branch statement addresses: 15 (move line 25 to 15), 20, 100 and 105 (move line 110 to 100) 145 (move line 150 to 145), 165, 180, 185, 230, 300 (move 305 to 300), 310, 320, 330, 400 (move 410 to 400). In line 425, change 405 to 400. 430 (move 440 to 430). □

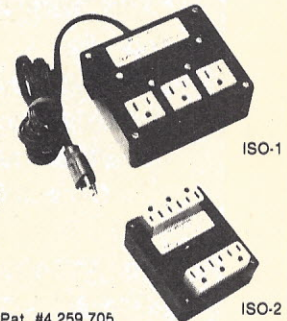
Program on page 154

Table 2. Variable names

- A = Number of data items that memory can hold with the program loaded
- B = Offset to bypass program (letter) variables.
A(B + 1) is the first data item. (On Casio, delete B throughout or set B = 0.)
- C = Number of data items in use
- D = Number of periods to average when adding data
- E = Index a data item in A
- F = Divisor used to compute average

**DISK DRIVE WOES?
PRINTER INTERACTION?
MEMORY LOSS?
ERRATIC OPERATION?**

**Don't
Blame The
Software!**



Power Line Spikes, Surges & Hash could be the culprit! Pat. #4,259,705
Floppies, printers, memory & processor often interact! Our patented ISOLATORS eliminate equipment interaction AND curb damaging Power Line Spikes, Surges and Hash. Guaranteed!

- ISOLATOR (ISO-1) 3 filter isolated 3-prong sockets; Integral Surge/Spike Suppression; 1875 W Maximum load, 1 KW load any socket \$69.95
- ISOLATOR (ISO-2) 2 filter isolated 3-prong socket banks; (6 sockets total); Integral Spike/Surge Suppression; 1875 W Max load, 1 KW either bank \$69.95
- SUPER ISOLATOR (ISO-3) similar to ISO-1 except double isolation & Suppression \$104.95
- SUPER ISOLATOR (ISO-11) similar to ISO-2 except double isolation & Suppression \$104.95
- MAGNUM ISOLATOR (ISO-17) 4 Quad isolated sockets; For ULTRA-SENSITIVE Systems \$181.95
- CIRCUIT BREAKER, any model (Add-CB) Add \$9.00
- CKT BRKR/SWITCH/PILOT (-CBS) Add \$17.00

AT YOUR
DEALERS

MasterCard, Visa, American Express
ORDER TOLL FREE 1-800-225-4876
(except AK, HI, PR & Canada)

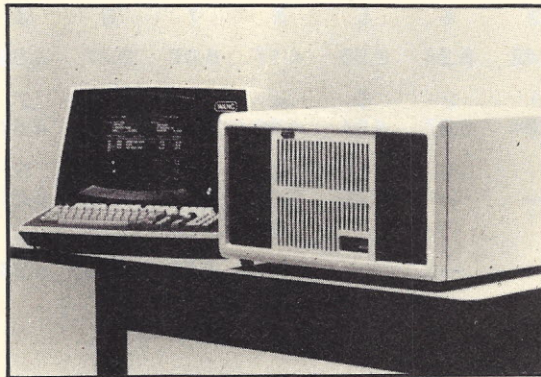
Electronic Specialists, Inc.

171 South Main Street, Natick, Mass. 01760

Technical & Non-800: 1-617-655-1532

CIRCLE INQUIRY NO. 37

Wang 2200SVP



A Good System Gets Better

	C-3 Accounts Receivable Time (min.)	Current Price
Wang 2200SVP	2:23.0	\$14,600
Pertec PCC 2000	6:04.3	\$12,470
North Star Horizon	1:57.7	\$ 6,911
Cromemco System Two	2:48.0	\$ 9,275
Texas Instruments 771	3:38.1	\$12,100
Vector Graphic System B	5:56.5	\$ 8,995
DECstation 78	5:04.8*	\$10,495
Radio Shack TRS-80 model II	3:38.6	\$ 7,609
Apple II +	6:17.4	\$ 4,330
Digital Microsystems DSC-2	3:28.8	\$ 9,015
Ohio Scientific C3-A	15:49.3	\$10,940
Alpha Micro AM-1011	3:25.3	\$15,605
Data General CS/10 model C1	**	\$13,400
Altos ACS8000-15		
SD Systems SD-200		
NEC Astra 205		
IBM 5120		

to be covered in future issues

*Result includes both compile and run time.
 **Time of 2:40.3 was obtained using hard disk system.

by Hillel Segal

With this issue, we begin looking at another group of 12 computers that have been benchmark-tested for the Association of Computer Users. Included in the group are a number of new systems, not available at the time the earlier tests were done. All are tested

with the same programs used previously, so the times are still comparable.

In the new group of computers, we are reporting on models priced as high as \$25,000 for a complete system. Some have multi-user capabilities, but all are being tested here for single-user performance.

The Benchmark Reports are written to provide as much information as possible on each system in a standardized form that makes it easy to compare

between different makes and models. They include the results of a variety of benchmark tests, covering processor speed, disk storage speed and performance in real-life programs.

We can't possibly provide all the detail of the full reports within a monthly article, so we have selected a single benchmark test for comparison. The one chosen is the accounts receivable problem, which simulates an actual accounting function. It uses a mixture of processor and disk operations to give an idea of the system's general speed.

The scorebox indicates the results of this test for 12 systems that were in the ACU Series 1 Benchmark Reports (IA Jan 81 through Mar 82).

The 2200SDVP is the third system by Wang Laboratories, Lowell, MA, that we've tested during the various benchmark series. Others were the 2200VP, tested in Series 2, and the 2200MVP in Series 3. Like its family members, the lower-priced 2200SVP did well in the tests. The accounts receivable time of 2 minutes, 23 seconds is among the fastest we've seen for a system tested using floppy disk storage.

Some systems in this price range now offer hard disk storage, but for better comparability, we are reporting the floppy disk-based times in the scorebox. Hard disk times, where applicable, are available in the full reports. The Wang 2200SVP, when tested with its 2 million character hard disk, ran the test in 29.1 seconds.

The system as tested included a CRT and keyboard, a separate unit with processor, 32,000 characters of memory, a 1-million character floppy, and a 2-million character hard disk; a dot-matrix printer that works at 125 cps; and the Basic-2 language. The total price was \$14,600. Wang also offers leasing and rental plans.

The basic unit comes with 32,000-character memory, and this was sufficient for the tests. The operating system and Basic language reside in a separate control memory. In addition, the system uses space compression techniques and allows parameter passing between programs, easing memory restrictions.

Top capacity doubled

Expansion to 64K was available at the time the tests were run, but Wang has since announced a group of improvements for the entire 2200 series. Among these are a new top capacity of 128K, plus an optional 8-million character Winchester hard disk drive.

The CRT terminal supplied with the system, model 2236DE, offers user-programmable function keys and an alternate character set for simple graphics. The screen has highlighting, blinking and reverse video (black on white). Brightness and contrast controls are also included. The keyboard has a crisp, typewriter-like feel, which users said they liked very much.

At the time the system was tested, it was available only in a single-user version. Now, perhaps the most significant enhancement is that up to 16 tasks can be going on in the 2200SVP at once. These can be used either by a single user or by multiple users at remote terminals. The new feature, called multiprocessing, can be added to existing systems.

Cobol has been added to Basic for this system, allowing more of the existing business software written in that language to be adapted for use. All benchmark testing was done in Basic, however.

The interactive Basic makes the operating system transparent to the user, although there are some system commands, such as CLEAR, HALT and RUN. The language provides a number of advanced features, such as MAT operations, PRINT USING, matrix operations for certain math problems and extensive error trapping. Debugging is assisted with a trace mode, single stepping and a cross-reference listing of program variables.

Our benchmark consultants noted that the file-handling capabilities are a bit awkward to use. For example, a modified program cannot be easily saved under its old name; to do this, one must first scratch the old program and its associated data files.

The program editor uses special editing keys and has other features for convenience, but is of conventional line-oriented nature, rather than taking more advantage of the screen.

Vendors supply most software

Wang has announced several new software aids, but the company leaves much programming to outside sources. The Wang packages include business accounting software, word processing and a software development tool called Ideas. Newly released is Datamerge, said to be the first module in a data management utility called Prism.

Most software for business users will come from vendors who develop applications programs and market complete, turnkey systems. Wang has a long list of approved vendors who offer business and engineering software along with Wang hardware.

For the user-survey portion of the report, our consultants (the University of Colorado Business Research Division) contacted eleven users of the system, using names supplied by the manufacturer. Most of the users had third-party software, but nearly half were also programming in-house. Only one had the Wang general business systems and word processing packages; this user thought they were both "great," and were largely self-explanatory.

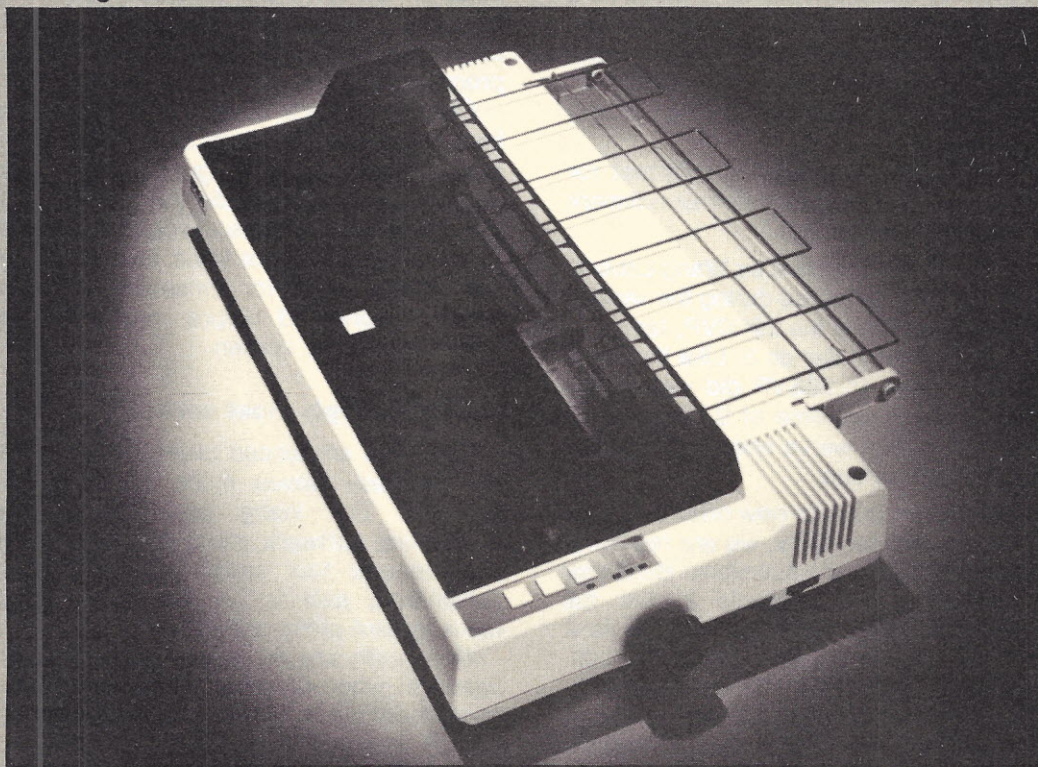
When customers listed their reasons for choosing this system, they mentioned ease of programming, speed, available third-party software, and power. The hardware was given good marks for dependability, while service was rated "fine" to "excellent."

Service is provided by Wang's customer service representatives. A standard 90-day warranty is included with purchase, and a priority maintenance contract is available at a cost of \$68 to \$137 per month, depending on the size of the configuration.

At the time the system was tested, it seemed its only serious limitation was the single-user limit. Now, with the announcement of multiprocessing and bigger storage capacity, the system has improved expandability. If both data and word processing are desired in a single system, the unit is especially worthy of consideration.

Hillel Segal is president of the Association of Computer Users, a non-profit association with members all over the U.S., Canada and several other foreign countries. A complete package of information about membership is available from ACU, P.O. Box 9003, Boulder, CO 80301. □

Epson MX-100 Printer



Full-sized and Full-featured

by Roger H. Edelson

The recent addition to the already fine line of printers from Epson (Torrance, CA), the MX-100, is not better solely because of its increased size, though that is certainly a major advantage. The unit combines all the best features previously scattered throughout the Epson line—the choice of either friction feed or fully adjustable tractors, the throwaway print head, bit image graphics, plus some simple (but very welcome) enhancements, and the 15-in. wide paper capability.

The MX-100 maintains the same low profile and two-tone styling characterizing the Epson line. The printer features a slightly raised smoke-colored printer lid (to incorporate the combined tractor/friction feed mechanism), and a redesigned paper separator and guide mechanism. The tractor feed mechanism (the sprocket unit) may be removed should it become an obstacle when using single sheets with the friction feed. This operation takes less than a minute, and the only difficulty encountered was trying to decide where to place the removed unit; replacement is just as easy. Manual paper movement is facilitated by a large knob on the right side that provides comfortable control of the paper position when manually advancing the paper, or aligning the top-of-form position. The control panel containing the paper advance controls (line feed—LF, and form feed—FF), the various indicators, and the ON LINE/OFF LINE control is placed very conveniently just above the paper advance knob.

One simple, but very welcome, touch in the mechanical design is the placement of the heads of the screws that secure the upper case to the lower half of the printer. These are placed in recesses in the upper case, so that they are available from the top of the unit. In the other Epson printers, these screws are accessed from the printer base, which requires turning the unit upside down before beginning to separate the case. In the earlier models, after the screws were loosened, the printer had to be righted to remove the upper case. This usually resulted in at least two screws falling from the unit base and getting lost. With the MX-100, the entire operation is performed without having to flip the printer. Also, let's have a moment of praise for the unsung genius in the mechanical design department of Epson who thoughtfully provided a full cutout for the manual paper control shaft; now it is possible to remove the upper case with a simple lifting operation, instead of maneuvering it as if you were trying to solve a Chinese puzzle.

The printer incorporates the throwaway type of print head assembly pioneered in the MX-80 and other Epson printers. This highly reliable device (it has a life expectancy of approximately 100 million characters) provides a 9 by 9 character matrix, which can serve both data-processing and correspondence requirements. As a matter of fact, all the reliability numbers for this printer are expressed in millions—the black ribbon cartridge is good for at least 2 million characters, and the entire printer (excluding the print head) has a MCBF (mean character between failure) rate exceeding

5 million lines. When in the 9 by 9 mode, the unit will print at 80 characters per second using bidirectional, and quickest path selection logic. In this mode, the print is quite readable with a full 96 ASCII character set incorporating lower case descenders, plus eight international character sets, selectable either through DIP switch settings or under software control. The print head is easily replaced, requiring only about 5 to 10 minutes, and the replacement is available for less than \$40.

The print head is capable of producing one original plus two carbon copies, which should be sufficient in this era of readily available reproduction machines, though there may be some difficulty when using multipart forms. The paper feed is from the rear, and also exits in the same direction. In my implementation, it is necessary to bring the printed output back over the top of the unit, and let it fall down the front to keep it from interfering with the paper supply. A reed switch is

provided to indicate when a paper-out condition is imminent, but the wizards at Epson also provided a DIP switch option, which allows the paper-out command to be disabled. This is particularly nice when using single sheet paper, as it allows printing to the bottom of the page.

To meet the requirements of correspondence quality printing, the user may select emphasized or double-emphasized print variations in either normal or enlarged sizes. Additionally, it is possible to select a condensed print size, allowing a maximum of 233 characters per line, when using full width paper. One can even mix the condensed and enlarged modes to give an 8.25 character-per-inch size, which provides a nice tradeoff between the 10 CPI standard and the 16.5 CPI condensed print. In this mode, it is possible to print 116 characters per 15-in. line, and approximately 70 characters on a single line of standard 8.5-in. paper.

Five of the many possible variations in print characters are shown in figure 1; these variations are obtainable

10 CPI Standard

```

ABCDEFGHIJKLMNPOQRSTUVWXYZABCDEFGHIJKLMNPOQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyzabcdefghijklmnopqrstuvwxyz
12345678901234567890!#$%&'()*+<?>!#$%&'()*+<?>
EPSON MAKES MORE PRINT MECHANISMS THAN ANYONE ELSE IN THE WORLD.
Epson makes more print mechanisms than anyone else in the world.

```

10 CPI Emphasized

```

ABCDEFGHIJKLMNPOQRSTUVWXYZABCDEFGHIJKLMNPOQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyzabcdefghijklmnopqrstuvwxyz
12345678901234567890!#$%&'()*+<?>!#$%&'()*+<?>
EPSON MAKES MORE PRINT MECHANISMS THAN ANYONE ELSE IN THE WORLD.
Epson makes more print mechanisms than anyone else in the world.

```

5 CPI Double Emphasized

```

ABCDEFGHIJKLMNPOQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890:-!#$%&'()*+<?>
EPSON MAKES MORE PRINT MECHANISMS
Epson makes more print mechanisms

```

8.25 CPI Double Emphasized

```

ABCDEFGHIJKLMNPOQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890:-!#$%&'()*+<?>
EPSON MAKES MORE PRINT MECHANISMS
Epson makes more print mechanisms

```

16.5 CPI Standard

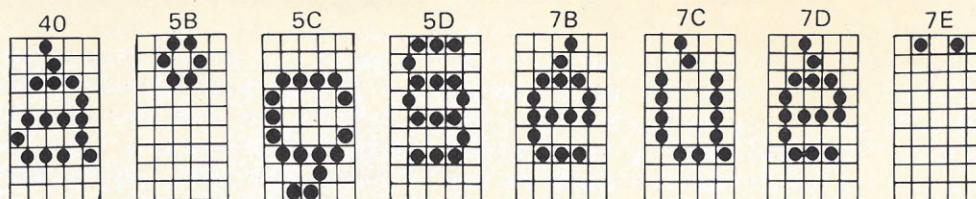
```

ABCDEFGHIJKLMNPOQRSTUVWXYZABCDEFGHIJKLMNPOQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyzabcdefghijklmnopqrstuvwxyz
12345678901234567890!#$%&'()*+<?>!#$%&'()*+<?>
EPSON MAKES MORE PRINT MECHANISMS THAN ANYONE ELSE IN THE WORLD.
Epson makes more print mechanisms than anyone else in the world.

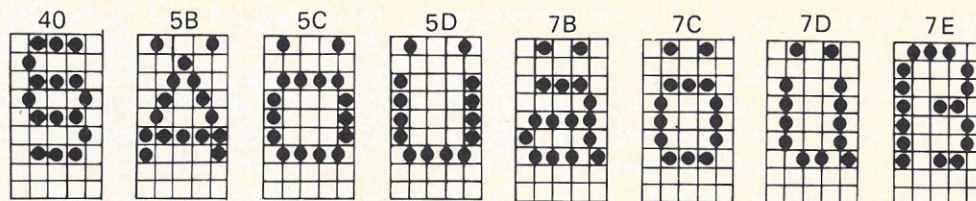
```

Figure 1. Sample print formations

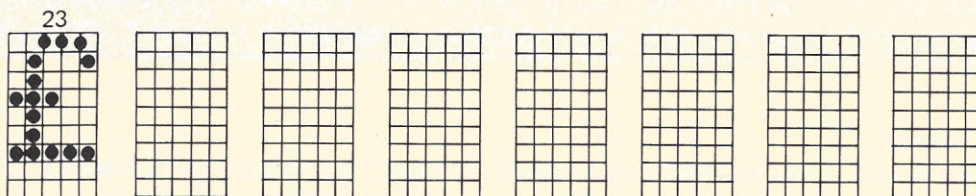
FRANCE



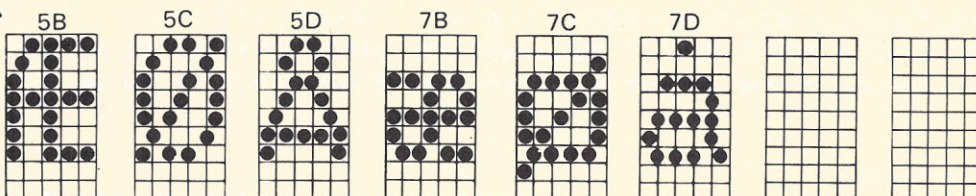
GERMANY



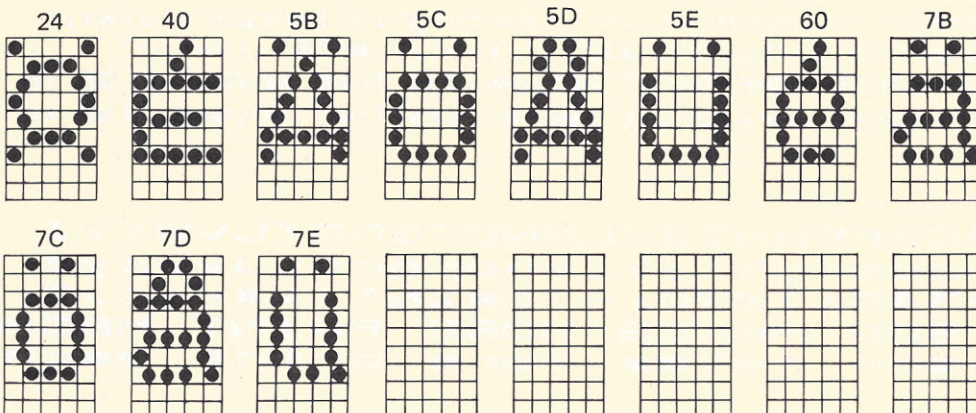
ENGLAND



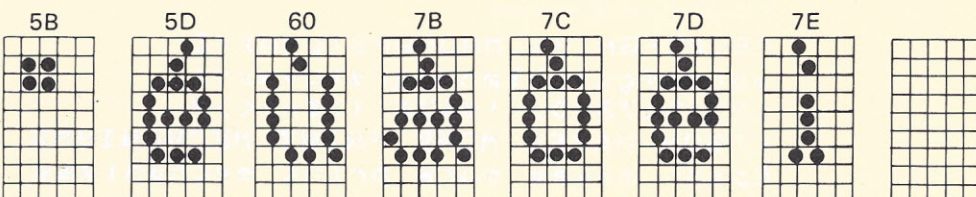
DENMARK



SWEDEN



ITALY



SPAIN

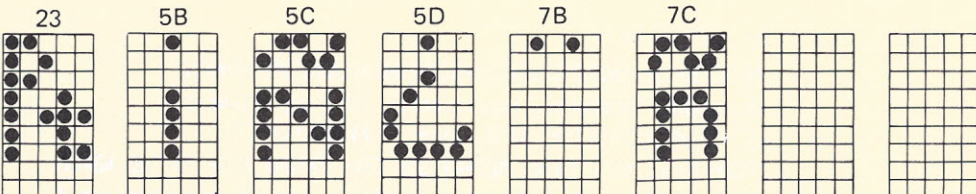


Figure 2. International character sets

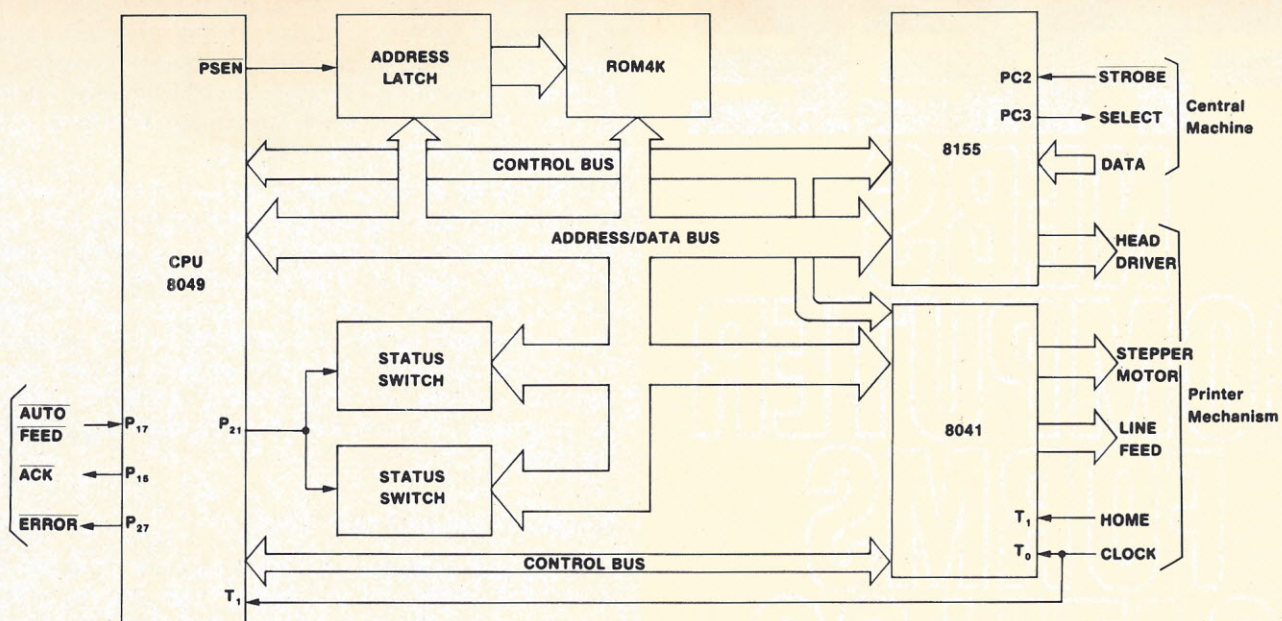


Figure 3. Control circuit diagram

through software control, and all the different character sizes may also be selected by appropriate settings of the printer DIP switches. The seven additional international character sets are illustrated in figure 2. Unfortunately, the only print style not carried over from the Grafrax option in the MX-80 line was the italic set. Maybe the company will offer this set later, when 32K PROMs are lower in cost. Additionally, it is possible to use a double strike command with any of the character modes to provide additional print highlighting when special emphasis is desired.

Besides providing superior quality text printing for both general usage and correspondence applications, the printer also possesses a Bit-Image printing mode for graphic data processing. In this mode, the printer has a dual capability, with a normal density mode of 816 horizontal dots-per-line, and 1,632 dots-per-line in the dual density mode. This horizontal resolution, coupled with the vertical resolution inherent in the nine-wire print head, allows precise placement of up to 10,368 dots in a square inch, making it possible to print accurate circles and even simulate pictorial brightness variations.

To convert the printer's operation from the Text mode to Normal-density Bit-Image mode, the host computer must transmit the "ESC K + n1 + n2" code. In this code, the n1 and n2 values are the two-digit hexa-

decimal numbers that define the amount of bit image data to be transmitted; the "+" symbols are shown only for legibility and should not really be transmitted. (Actually, the printer operates on the binary values of these four bytes.) The eight bits represented by n1 make up the low order byte of the two-byte word, setting the number of dot positions to be reserved for graphics for the line being printed from the point on the line that the control code "ESC K" was transmitted. As no more than 816 dot positions may be printed per line in the normal density mode, any number greater than this value is ignored, and the printing of bit image data after the 816th dot position cannot be guaranteed. When printing graphics in the Bit-Image mode, it is necessary to re-establish the mode for each line printed.

To achieve all these features, the unit relies on a single chip microprocessor, the 8049, in conjunction with three 16K EPROM and LSI interface chips, as shown in the block diagram of the control circuitry (figure 3). The use of a microprocessor allows the printer to logically determine the shortest printing path when in the bidirectional mode to increase the printer throughput. The internal computer also provides programmable line-feed length (1/72 in. to 85/72 in.), programmable form feed (to 127 lines), horizontal tab (to 12 positions), and eight positions of vertical tab.

```
( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W
) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X
* + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y
+ , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
, - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [
```

Figure 4. Self-test printout

FREE NEBS COMPUTER FORMS CATALOG

Send today for our NEW full-color 56-page catalog with continuous checks, statements, invoices, stationery, envelopes, supplies and accessories. We will also send our FORMS SELECTOR GUIDE, to help you find the right forms for your software.

- **Quality products at low prices**
- **Available in small quantities**
- **Fast Service**
- **Money-Back Guarantee**
- **Convenient TOLL-FREE ordering**

Fast Service by mail or...PHONE TOLL FREE
1 + 800-225-9550

Mass. residents 1 + 800-922-8560

8:30 a.m. to 5:00 p.m. Eastern Time Monday — Friday

Please rush a new computer forms catalog to:

NAME _____

COMPANY _____

STREET _____

CITY, STATE and ZIP _____

PHONE _____

Hardware and Software being used. _____



**Nebs
Computer Forms**

CODE 11460

78 Hollis Street, Groton, Massachusetts 01471
A division of New England Business Service, Inc.

The printer also has programmable skip-over perforation, which is selectable by DIP switch setting or controllable by the software of the host computer. While a Centronics style 8-bit parallel interface is standard, an optional RS-232 serial port may be added, or one can even configure the printer interface to be compatible with the IEEE 488 bus.

The interior of the printer is neatly laid out, consisting of the single board controller, containing the CPU and all the ancillary integrated circuits, a power supply area, and a small fan. The MX-70 and MX-80 printers (IA Jan. 82) did not have fans. Presumably with a longer continuous print length, the company found it advisable to add one to the MX-100. The single controller board provides a socket for adding optional adapters should an interface different than the standard parallel port be required.

Simple setup and operation

Setup and operation of the MX-100 are unsurpassed in simplicity. All that is required is to unpack the printer and its related parts and spend about 15 minutes in assembly. The only tools required are a pair of screwdrivers, one phillips-head and one flat-blade, at least according to the manual. (I have yet to find a screw requiring a flat blade screw driver.) The screwdrivers are used to remove the shipping screws and the screws that secure the upper half of the case. This latter step is needed to allow access to the DIP switches for setting the functions and characteristics of the printer operation. After these switches have been set to the desired states, it is possible to check the printer operation by activating the self-test function. To do this, one turns on the printer power while depressing the LF (line feed) button. The self-diagnostic function will check the print head operation and print quality, as well as the operation of the printer mechanisms. All characters provided by the internal software (as selected by the DIP switches) are printed out in barber-pole fashion (figure 4). If the serial RS-232 interface is in place, its operation may be checked through the use of the self-test button provided.

After it has been established that the printer is functioning correctly and the interface is operating normally, all that remains is to connect the MX-100 to the computer and start printing. To set the top-of-form position when positioning the paper, turn the printer off, position the paper, then turn it back on again. This operation initializes the printer functions, and can also be done by applying the INIT* signal to the parallel interface. I wish the designers had added a control to accomplish this function, so that it didn't become necessary to cycle power whenever repositioning the paper; I don't think it enhances the reliability of any electronic device to continually subject it to power transients. Sometime in the near future, I plan to modify my MX-100 to add this function. Also, it would be nice if it wasn't necessary to take the printer off-line to activate the form feed control. In this case, there is no question of damage or stress to the printer. But it is somewhat annoying when printing out consecutive files with each file to be started at the top of the sheet.

With a full-sized carriage, user-friendly operation and a list price of under \$1,000, the MX-100 is an exceptional value among dot matrix printers. □

An open letter to the readers of Interface Age

Hillel Segal, President, Association of Computer Users

My purpose in writing is to tell you that my colleagues and I have decided to launch a program that could dramatically help you manage your computer resources. It will be called *Computer Assistance Teams* or CATS for short.

Ever since the Association of Computer Users was formed in 1974, I have been thinking and dreaming about the possibility of starting a program that, quite literally, would allow each member to directly benefit from the experiences of other users. By setting up teams of users around the country, members would be able to draw upon the knowledge and skills of the other team members when looking for software, checking hardware reliability or handling the many problems that users face regularly.

This has never been done before. Usually, each user is on his own—continually reinventing the wheel. This is the traditional way most computer users operate; not that they want to, but simply because they have no other choice. Up until now, a program hasn't existed that easily allowed users to seek and receive advice from other users. ACU is now starting such a program, and we need team members from every city, town, and hamlet in the United States and Canada to make it a success.

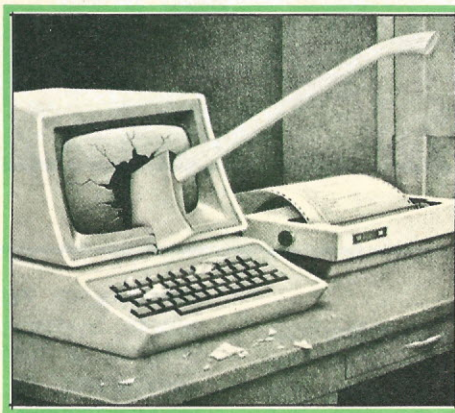
My hope, therefore, is that we can find enough readers, in addition to our current members, to make this plan feasible. You can participate by becoming a member of the Association of Computer Users. At the same time, you would also receive all of the other benefits of ACU membership.

What about the Association itself?

We believe that ACU has several unique functions in the computer industry. First of all, as a non-profit user organization with elected officers, our primary obligation is to represent and serve computer users and prospective users. (Those involved in the sale of computer products or services are welcome to join too, but they are not

permitted to vote or hold office.)

Secondly, our monthly journal *Interactive Computing*, our BENCHMARK REPORTS that review computer systems, and all of our other publications are geared to (1) provide practical "how-to" advice on the selection of hardware and software, and (2) use it productively. What makes ACU special is its unique user-point-of-view.



For example, not long ago we displayed the drawing shown here on the front cover of *Interactive Computing*, along with an article entitled "Ten Pitfalls To Avoid In Buying A Small Computer." The entire issue demonstrated our independent tell-it-like-it-is attitude. Users loved it, and many vendors even ordered reprints.

In addition, many readers of *Interface Age* have followed my regular column in these pages during the last year, so you may already be familiar with ACU's activities.

I think enough has been said to indicate that the new CATS program will direct its central energies to both the users' current needs and future problems.

But it would be a mistake, I think, to attempt a full description of the program. Programs like these are not really invented or created. They evolve. They are the product of creative interaction between the special needs and enthusiasms and concerns of those involved.

In this way, ACU serves as a catalyst, and our publications and programs take shape issue by issue and year by year. No single issue of our journal (which carries no advertising), can really be expected to tell a reader everything he may want to know about a particular subject. Similarly, since it might be misleading to try to tell you exactly how the CATS program will work, what I have tried to do is to tell you something about our philosophy and approach—and to seek your participation to make it a success.

Some specifics: Membership in ACU costs \$65 per year—which is not a lot compared to other information sources that provide real value. Included with your membership is a binder and all back issues of our journal still in print.

We ask for no money now. That can come later. What we need right now is an expression of your interest.

As I said, in inviting you to join ACU, we realize we are asking for your confidence. We have high hopes of fulfilling your expectations. The process begins with the application form below.

Sincerely,

Hillel Segal

ASSOCIATION OF COMPUTER USERS

P.O. Box 9003, Boulder, CO 80301

Please enter my membership in ACU and bill me later.

Name, Title _____

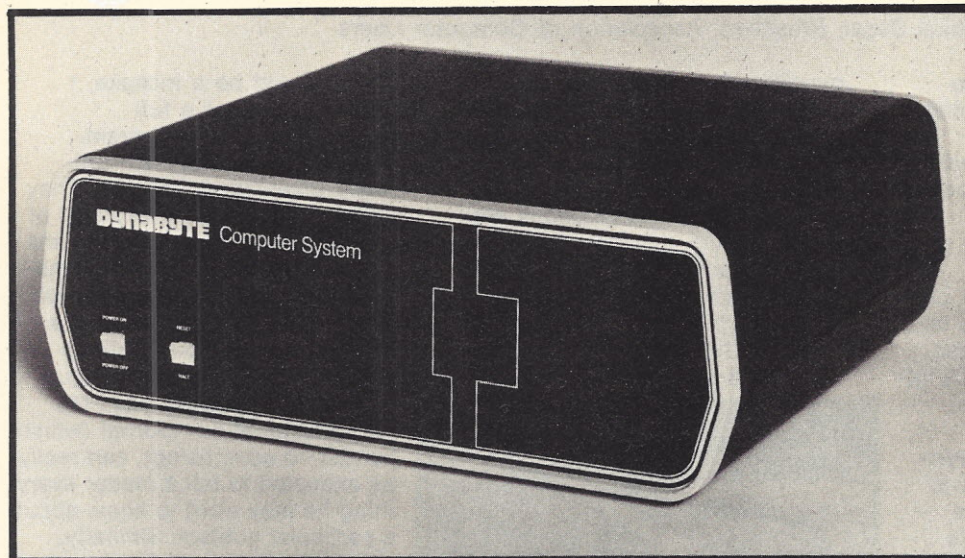
Company _____

Street _____

City, State, Zip _____

I.A.4

DYNABYTE 5505



by Tom Fox

Dynabyte, (Milpitas, CA), introduced computers that were characterized by a distinctive, sculptured box clad in real (not simulated) walnut veneer, when the company opened in 1977. Now, the wood is gone, but the basic layout of Dynabyte computers has remained much the same through the years.

The systems adhere to the S-100 design specification, although not to the stricter requirements of the new IEEE-standard 696. The term "S-100 bus" describes the physical and electrical configuration of the computer circuit boards, and the way in which they interconnect with each other. In Dynabyte's case, one of the boards contains the central processor, a Z80 microprocessor-integrated circuit device. The Z80 is an 8-bit device, running in this case at a rate of 4 MHz.

Dynabyte's 5000-series business microcomputers comprise a varied family, allowing some 40 different configurations of memory, disk and peripheral devices. For our testing, we selected the 5505, because it utilizes the smallest of a new generation of mini-Winchester disk drives. This device contains a single hard disk platter measuring just 5¼-in. in diameter. It's sealed within a remarkably small hermetic enclosure, mounted in a cradle of soft rubber suspensors. The entire disk drive is designed to fit into the space normally occupied by a standard 5-1/4-in. minifloppy diskette drive. The drive is supplied to Dynabyte by Tandon, and carries the designation TM602.

The data capacity of this mini-Winchester is very *un*-mini indeed. A total of 6.4M bytes of information can be stored—up to 20 times as much as many comparably-sized floppy diskette drives. The formatting requirements of this unit extract some 17% of overhead, leaving just 5.32M bytes of user-accessible space.

The 5M-byte+ size of the disk drive is the single characteristic of the 5505 that propels it out of the

category of traditional floppy-based business computers. Suddenly, programmers do not have to think in terms of having different diskettes for different applications, or partitioning large data bases in an illogical manner. The end user is relieved of much of the librarian task of sorting through a collection of floppies to find a misplaced application. The advance of hardware technology has allowed the encroachment of "big computer" thinking into a desktop-sized micro.

In addition to the Winchester, the 5505 contains a second built-in disk drive. This is a single-sided, double-density minifloppy diskette device, Tandon's TM100-3M. It also utilizes a 5-1/4-in. medium, and has a capacity of 315K bytes of formatted, usable data space. The main function of the floppy is to make a safety copy of the data contained on the larger hard disk, guarding against the day the Winchester device fails—or perhaps the accidental erasure of data by a careless operator. This is called "backing up" the data—an absolutely essential activity when living with a computer.

A little arithmetic reveals that a full 5.32M-byte Winchester will fill up a total of 17 315K-byte floppy diskettes. This suggests that the backup procedure might become a tedious chore—as it certainly could. To make matters worse, most users make at least two backup copies of critical data—one stored off-premise to guard against a fire or other disaster. In actual practice, it's usually only necessary to back up a portion of the large disk on a regular basis. Much of the modern programmer's thinking is applied towards making that portion as small as possible.

In the 5505, the floppy disk has at least two other important functions. One is to act as the means of transporting programs and data between this computer and other systems. When you purchase software, it usually arrives in the form of a program written on a floppy diskette. You only have to make sure that the

diskette is compatible with the format of your drive. One of the first tasks after opening the Dynabyte shipping carton is to copy the operating system software from a floppy onto the Winchester device. If all goes well, the original floppy can be stored away as a backup, since it is unlikely to be needed again.

In normal operation, the 5505 will "boot up" from the Winchester drive. This means that programs resident on the hard disk are loaded into the processor's main memory, so that the machine can begin to act like a computer. What do you do on the day the critical systems programs get accidentally erased from the Winchester? Here we come to the second important use for the floppy diskette drive. You simply insert the as-delivered system diskette, and the computer will boot up, using the programs in the floppy device. Equipped with a whole computer once again, a programmer is then able to diagnose (possibly even fix) the problem with the Winchester data.

Specialists develop software and languages

At one time, computer manufacturers inevitably found themselves in the business of creating software operating systems and programming languages, as well as the hardware bits of the machines. These days, there is an excellent selection of systems software, and it is no mark of shame when a computer maker chooses to let the established specialists handle this aspect of the development effort. As Dynabyte computers are Z80-based, they rely heavily on Digital Research's CP/M operating system for single-user environments, and companion MP/M when multiple users are called for. In addition, the competing OASIS operating system from Phase One Systems is available in both single- and multi-user versions.

Most of the major microcomputer manufacturers have spent considerable effort in "tuning" the available operating systems to match the capabilities of their hardware. Dynabyte is certainly no exception, and maintains a permanent staff of competent software engineers to take care of this aspect alone.

CP/M, for example, has been enhanced to allow the display of a user-specified message during the boot-up process. In addition, the system can be trained to automatically wake up into an applications program, such as WordStar or a customized bookkeeping package. This allows a programmer to make all aspects of the computer operation "user friendly" with menus and other such techniques. The computer operator need have no training at all into the mysteries of PIP and ED, to mention just two traditional stumbling blocks for beginners.

DYNASYS is the name of a versatile CP/M utility that manages several aspects of the system's initial set-up. Menu-driven, this program handles the assignment of logical disk devices, formatting and creation of system and data disks and definition of the system's terminal(s) and printer(s). It is the most elaborate of a series of programming utilities intended to streamline the initial setup and operation of the computer system.

Similar attention has been lavished on the considerably more difficult task of making multi-user MP/M rest easily within Dynabyte frames. Up to eight terminals are supported simultaneously—up to 16 printers, too. A maximum of 16 logical disk devices are supported,

and there's no requirement that they all be the same size. MP/M requires 32K bytes of memory for its own operation, and allows each terminal to occupy 48K bytes of space for its exclusive use. When purchasing a multi-user computer, make sure there are enough slots in the motherboard to accommodate future memory needs as terminals are added.

MP/M is, of course, compatible with applications programs written for the single-stream CP/M environment. The manufacturer, in fact, makes the statement that *any* program that runs on one of its computers will run on any other Dynabyte of the same or larger size—assuming that the operating systems are compatible.

As we've stated, the Dynabyte staff does not see themselves as creators of major software packages. They do, however, take a lot of trouble sifting through the sea of available programs and offer what they consider to be the best of them as a part of their computer lineup. Their chosen word processor is MicroPro International's WordStar, along with the supporting programs SpellStar and MailMerge.

This manufacturer's choice in the VisiClone field of spread-sheet analyzers is Business Planner. It can handle up to 20 columns of 50 rows of financial data. Each row/column intersection can be filled with financial or other data, and the program automatically computes row and column totals as needed. A variety of arithmetic manipulations are allowed, including some rather complex formulas. Business Planner runs under CP/M or MP/M.

Business Manager is a comprehensive array of general accounting programs applicable to a variety of business situations. Accessible entirely via a hierarchical set of

dBASE II—\$595⁰⁰

30 DAY MONEY-BACK GUARANTEE

—FREE BOX OF DISKETTES WITH EVERY ORDER—

With dBASE II you can extend the power of your microcomputer to jobs that were previously reserved for the larger mainframes. Here's a partial list of applications that dBASE II has been used for:

- General Ledger
- Journal of Accounts
- Accounts Receivable
- Accounts Payable
- Sales Tax Records
- Payroll
- Check Management and Writing
- Time Billing
- Inventory Control
- Job Costing
- Tax Computation
- Document Cross Referencing
- Legal Office Accounting
- Scheduling
- Mailing Labels
- Calendar Events

If your application calls for managing data, dBASE II may be the answer.

You can create a database and start entering data into it in less than a minute.

Type CREATE, then respond to the dBASE II prompts to name the file and define the fields in your records.

Once the record is defined, you can start entering data immediately, or add information later by typing APPEND. In both cases, dBASE presents you with an entire record structure for which you simply fill in some or all of the blanks.

Now, for a limited time only, you can purchase the most powerful DBMS system for your micro for the incredibly low price of \$595 delivered. We'll send you a copy of dBASE II, that you can run on your system, for 30 days. If you're not completely satisfied, then just send everything back and we'll return your money, no questions asked! Even if you go for another system, you'll be an informed buyer!! (dBASE II is a fine product by Ashton-Tate)

STANDARD SOFTWARE CORPORATION OF AMERICA

10 MAZZEO DRIVE, RANDOLPH, MA 02368

CALL (617) 963-7220

ORDERS ONLY

LARGEST SELECTION
OF CPM SOFTWARE
IN THE U.S.A.



1-800
343-8420

JUST IN TIME FOR YOUR 1981 TAX RETURN!

TAXMAN - 82

An Interactive TAX Management Program For
VisiCalc™ & SuperCalc™ Users

TAXMAN-82 was designed for interactive use by the taxpayer himself, to reduce the burden of tax calculations and tax form preparations.

TAXMAN-82 provides the user with the capability to easily calculate his 1981 taxes by using the already proven VisiCalc™ and SuperCalc™ software.

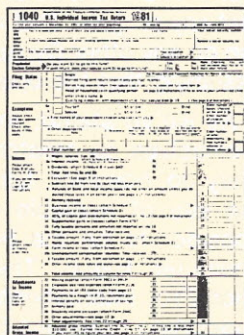
TAXMAN-82 includes the following features:

- Federal 1040 pages 1 & 2
- Schedules A, B, C, D, E, F, G, R, RP, SE, ES
- Forms 1116, 2106, 2119, 2210, 2440, 2441, 3903, 4136, 4137, 4255, 4625, 4684, 4726, 4797, 4868, 4874, 4952, 4970, 4972, 5329, 5405, 5544, 5695, 5884, 6249, 6251, 6252
- Tax Tables A, B, C, D
- Tax Schedules X, Y, Z
- Sales tax tables for all states, plus local multiplier

TAXMAN-82 produces all final calculations and results that need only to be transcribed to the proper tax form, as detailed in the TAXMAN-82 documentation manual.

TAXMAN-82 is now available for any micro-computer utilizing VisiCalc™ or SuperCalc™.

VisiCalc is trademark of Personal Software Incorporated
SuperCalc is trademark of Sorcim Corporation



PRICED AT ONLY
\$95.00

Phone Orders Call:
1-205-533-7590
(same day shipment)

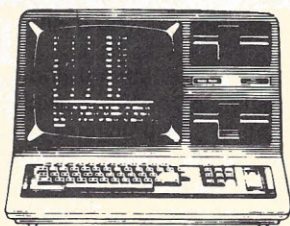


ATSUKO
COMPUTING
INTERNATIONAL
303 Williams Avenue, Huntsville, AL 35801

CIRCLE INQUIRY NO. 9

**Biggest
Discounts
Ever On**

TRS-80™



**& Hewlett-Packard
Computers and Accessories**

- **FREE SHIPPING** in 48 continental contiguous states on prepaid orders of \$100 or more.
- **NO SALES TAX** collected on out-of-state orders.
- **FREE COMPLETE PRICE LIST** available upon request.

TOLL FREE ORDER NO. 800-531-7466

Texas & Principle No. 512-581-2766

Fort Worth No. 817-625-6333

Telex Number 767339

Pan American Electronics

Dept. 54 • 1117 Conway Avenue
Mission, Texas 78572

Fort Worth Branch

Dept. 54 • 2912 N. Main St.
Fort Worth, Texas 76106

TRS-80 is a Trademark of Tandy Corp.

user menus, the package includes sales order entry, accounts receivable, purchase order management and inventory, accounts payable and general ledger. Two additional modules, payroll and point-of-sale, can be integrated but are priced separately. The system is available in three versions, depending upon the capacities of the installed 5-1/4-in. disk drives. The model we tested was the 5505-A1, fitted with 5.3M bytes of usable Winchester storage, and 315K bytes of single-sided, double-density floppy storage. This carries a list price of \$6,995. The 5505-B1 contains 8.9M bytes of Winchester storage and a double-sided floppy (630K bytes), and lists for \$7,695. Finally, the 13.4M-byte 5505-C1, which contains the same double-sided diskette drive, costs \$8,495.

In addition to the disk drives, these prices include the processor, 64K bytes of RAM and three I/O ports: two serial and one parallel. Additional RAM is available at \$595 per 64K bytes. For multiple users, a 4-port serial I/O board is available for \$495; a larger 8-port version for \$795.

Single- and multi-user systems offered

All software is priced separately. Digital Research's CP/M lists for \$195 and Phase One's OASIS for \$595. Both are single-user operating systems. Multi-user MP/M and OASIS are available as well, for \$495 and \$995, respectively.

Growing into a multi-user system necessarily requires the addition of memory and additional I/O ports. To ease the shopping chore, Dynabyte offers a pre-packaged Multiuser Expansion Kit. This will cost \$1,995, and includes 192K bytes of RAM, a 4-port serial I/O board and the MP/M operating system.

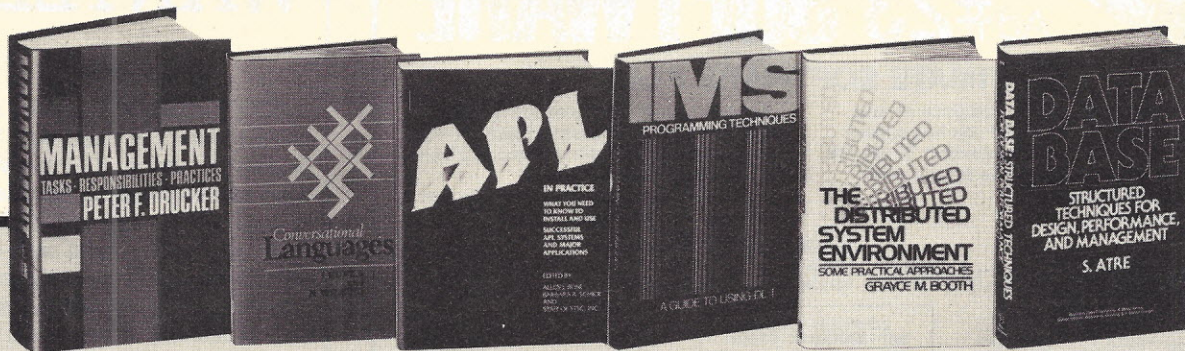
Although we know that a host of programming languages and applications programs are available on all CP/M systems, Dynabyte lists a fair number in its catalog that have been certified as operational on the 5505. These include Microsoft's Basic interpreter (\$400) and compiler (\$500), the semi-compiled CBasic (\$150), Fortran-80 (\$600) and Cobol (\$995). The WordStar word processing program lists for its usual \$495, with attendant SpellStar and MailMerge at \$150 each. The multi-talented Business Planner will cost \$495, and the extensive capabilities of Business Manager can be yours for \$995—\$1,000 more if you need the multi-user version.

Other versions of the same basic computer are available. The Dynabyte 5615 is similar, but built around 8-in. Winchester and floppy disk drives. This version requires a double stacked cabinet, has disk capacities up to 36.7M bytes and will cost from \$2,000 to \$4,500 more than the 5-1/4-in. varieties.

An interesting new machine is the Dynabyte 5710, which forsakes floppy disks entirely in favor of a data-quality cartridge tape drive. If you're considering the 8.9M-byte 5505-A2, take a look at the 5710-A1. It uses the same Winchester disk drive, and contains as well a 13.4M-byte cassette tape mechanism. The convenience of backing up the entire disk onto a single tape cassette (instead of up to 17 separate floppy diskettes) seems to us good enough reason to spend the extra \$1,300. Since the cartridge idea is so new, expect some problems in acquiring outside software until the vendors start distributing their programs in compatible cartridges. □

THE LIBRARY OF COMPUTER AND INFORMATION SCIENCES

—the oldest, largest and most respected book club for the computer professional



Take any 3 books for only \$1.00 each (values to \$74.90)

You simply agree to buy 3 more books—at handsome discounts—within the next 12 months.

(Publishers' Prices Shown)

42213. DICTIONARY OF BUSINESS AND MANAGEMENT. *Jerry M. Rosenberg.* Over 8000 entries. **\$24.95**

42303. A DISCIPLINE OF PROGRAMMING. *Edsger W. Dijkstra.* Program derivation and composition, common mistakes plus numerous other examples. **\$22.95**

42420. THE DISTRIBUTED SYSTEM ENVIRONMENT: Some Practical Approaches. *Grayce M. Booth.* Covers horizontal and hierarchical distributed structures, networking and much more. **\$21.95**

34115. APL IN PRACTICE. *Edited by Allen J. Rosen et al.* Covers such topics as writing maintainable APL codes, evaluating telecommunications networks, using APL for construction accounting and more. **\$25.00**

39890-2. COMPUTER DATA-BASE ORGANIZATION. *James Martin.* An invaluable planning tool by the world's foremost computer author. Contains over 200 diagrams. *Counts as 2 of your 3 books.* **\$27.95**

54455. IMS PROGRAMMING TECHNIQUES: A Guide to Using DL/I. *Kapp and Leben.* Spells out specific techniques to write application programs in ANS COBOL, PL/I, or Assembler Language in an IMS DL/I data base environment. **\$17.95**

59920. MANAGEMENT: Tasks, Responsibilities, Practices. *Peter F. Drucker.* The skills, techniques and tools a good executive needs to stay effective in modern management. 839 pages. **\$23.95**

41628-2. DATABASE: Structured Techniques for Design, Performance and Management. *S. Atre.* Spells out how to plan, design and maintain a large data base for batch and on-line operations. 444 pages. *Counts as 2 of your 3 books.* **\$27.95**

79155. SOFTWARE INTERPRETERS FOR MICROCOMPUTERS. *Thomas C. McIntire.* How to design a reliable software interpreter for any microcomputer system. **\$23.95**

42053-2. DESIGNING A DISTRIBUTED PROCESSING SYSTEM. *Hamish Donaldson.* Includes file strategy, communication networks, and workflow design. *Counts as 2 of your 3 books.* **\$34.95**

32485. ALGORITHMS + DATA STRUCTURES = PROGRAMS. *Niklaus Wirth.* "A valuable, novel contribution to the computing science literature." —Edsger Dijkstra. **\$20.95**

84238. 370/360 ASSEMBLER LANGUAGE PROGRAMMING. *Nancy Stern et al.* A step-by-step handbook that takes you from the basics all the way through efficient, sophisticated coding. 516 pages; softcover. 8½" x 11" format. **\$19.50**

87970-2. WRITING INTERACTIVE COMPILERS AND INTERPRETERS. *P.J. Brown.* Includes how to design an internal language, error detection and diagnosis in the run-time system, and much more. *Counts as 2 of your 3 books.* **\$26.95**

79240. SOFTWARE PSYCHOLOGY: Human Factors in Computer and Information Systems. *Ben Shneiderman.* **\$24.95**

39960. COMPUTER-ASSISTED DATA BASE DESIGN. *George V. Hubbard.* A complete look at data models, editing, design tactics, root anchor points and much more. **\$24.95**

53677-2. HOW TO BUILD YOUR OWN SELF-PROGRAMMING ROBOT/ROBOT INTELLIGENCE...WITH EXPERIMENTS. *David L. Heiser.* Two books. *Counts as 2 of your 3 books.* **\$29.90**

55845. INTERACTIVE COMPUTER GRAPHICS. *Wolfgang K. Giloi.* A practical guide to data structures, algorithms and programming languages for generating effective graphic displays. **\$22.95**

39965. COMPUTER CAPACITY: A Production Control Approach. *Melvin J. Strauss.* Provides the formulas and the strategies necessary to make accurate estimates of computer usage demands. **\$24.95**

41785. DEBUGGING SYSTEM 360/370 PROGRAMS USING OS AND VS STORAGE DUMPS. *D. H. Rindfleisch.* A superior guide to storage dump debugging. Illustrations, examples, sample dumps. **\$24.95**

40045-2. CONVERSATIONAL LANGUAGES. *Kupka and Wilsing.* Covers interactive program development, languages based on JOSS, syntax and design of conversational languages and more. *Counts as 2 of your 3 books.* **\$27.95**

81845. SYSTEM/370 JOB CONTROL LANGUAGE. *Gary DeWard Brown.* Includes descriptions of hardware devices and access methods and reference to many useful JCL features. Softcover. **\$13.50**

37980. CIARCIA'S CIRCUIT CELLAR: Volumes I and II. *Steve Ciarcia.* Over a years worth of Ciarcia's most popular microcomputer articles from BYTE. Softcover. **\$20.95**

38968. THE COBOL ENVIRONMENT. *Grauer and Crawford.* **\$20.95**

56712. INVITATION TO FORTH. *Harry Katzan, Jr.* A comprehensive introduction to the powers, syntax, verbs and data structures of FORTH, a flexible language which fits into any microcomputer environment. **\$17.50**

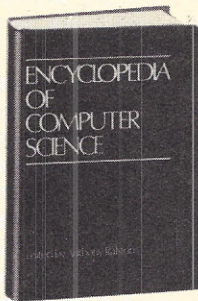
78333. SIMPLIFIED ACCOUNTING FOR ENGINEERING AND TECHNICAL CONSULTANTS. *Hayes and Baker.* Covers partnership share accounting, compensation plans, time accounting, systems of billing and more. **\$24.95**

70691. PROGRAM FLOW ANALYSIS. *Edited by Mushnick and Jones.* A comprehensive look at a statistical method which can yield more efficient and reliable software. **\$23.50**

79167. SOFTWARE RELIABILITY GUIDEBOOK. *Robert L. Glass.* Analysis of technical tools available for software design and implementation. Includes applications from small operations to mammoth projects. **\$18.95**

70725-2. THE PROGRAMMER'S ANSI COBOL REFERENCE MANUAL. *Donald A. Sordillo.* Organized alphabetically, and heavily cross-referenced, provides a complete reference to COBOL verbs, syntax concepts and uses. *Counts as 2 of your 3 books.* **\$27.95**

EXTRAORDINARY VALUE!



ENCYCLOPEDIA OF COMPUTER SCIENCE. *Edited by Anthony Ralston.* Monumental 1,500-page volume on every aspect of the computer sciences—software, hardware, languages, programs, systems, mathematics and more. Over 700 charts, tables, graphs and diagrams. *Counts as 3 of your 3 books.* **\$60.00**

If reply card has been removed, please write: The Library of Computer and Information Sciences, Dept. 7-BA7, Riverside, N.J. 08075, to obtain membership information and application.

FREE
with software purchase—
One CPM Handbook

DISCOUNT SOFTWARE

Ad#23

ULTIMATE SOFTWARE PLAN

We'll match any advertised price on any item that we carry. And if you find a lower price on what you bought within 30 days of buying it, just show us the ad and we'll refund the difference. It's that simple.

Combine our price protection with the availability of full professional support and our automatic update service and you have the Ultimate Software Plan.

It's a convenient, uncomplicated, logical way to get your software.

✓ (New items or new prices)

CP/M users:

specify disk systems and formats. Most formats available.

CP/M®

DISK WITH / MANUAL ONLY

ARTIFICIAL INTELLIGENCE®
Medical (PAS-3).....\$849/\$40
Dental (PAS-3).....\$849/\$40

ASYST DESIGN®
Prof Time Accounting.....\$549/\$40
General Subroutine.....\$269/\$40
Application Utilities.....\$439/\$40

COMPLETE BUS. SYSTEMS®
Creator.....\$269/\$25
Reporter.....\$169/\$20
Both.....\$399/\$45

COMPUTER CONTROL®
Fabs (B-tree).....\$159/\$20
UltraSort II.....\$159/\$25

COMPUTER PATHWAYS®
Pearl (level 1).....\$ 99/\$25
Pearl (level 2).....\$299/\$40
Pearl (level 3).....\$549/\$50

DIGITAL RESEARCH®
CP/M 2.2
NorthStar.....\$149/\$25

TRS-80 Model II (P+T)
Micropolis.....\$159/\$35
PL/I-80.....\$459/\$35
BT-80.....\$179/\$30
Mac.....\$ 85/\$15
Sid.....\$ 65/\$15
Z-Sid.....\$ 90/\$15
Tex.....\$ 90/\$15
DeSpool.....\$ 50/\$10
CB-80.....\$459/\$35
CBasic-2.....\$ 98/\$20

D.M.A.
Ascom.....\$149/\$15
Formula.....\$539/\$45

GRAHAM-DORIAN®
General Ledger.....\$729/\$40
Acct Receivable.....\$729/\$40
Acct Payable.....\$729/\$40
Job Costing.....\$729/\$40
Payroll II.....\$729/\$40
Inventory II.....\$493/\$40
Payroll.....\$493/\$40
Cash Register.....\$493/\$40
Apartment Mgt.....\$493/\$40

MICRO-AP®
S-Basic.....\$269/\$25
Selector IV.....\$295/\$35
Selector V.....\$495/\$50

MICRO DATA BASE SYSTEMS®
HDBS.....\$269/\$35
MDBS.....\$795/\$40
DRS or QRS or RTL.....\$269/\$10
MDBS PKG.....\$1295/\$60

MICROPRO®
WordStar.....\$319/\$60
Customization Notes.....\$429/\$na
Mail-Merge.....\$109/\$25
WordStar/Mail-Merge.....\$419/\$85
DataStar.....\$249/\$60
WordMaster.....\$119/\$40
SuperSort I.....\$199/\$40
Spell Star.....\$175/\$40
CalcStar.....\$259/\$na

MICROSOFT®
Basic-80.....\$298
Basic Compiler.....\$329
Fortran-80.....\$349
Cobol-80.....\$629
M-Sort.....\$124
Macro-80.....\$144
Macro-88.....\$259
Edit-80.....\$ 84
MuSimp/MuMath.....\$ 84
MuLisp-80.....\$174
Multi Plan.....Call
Manager Series.....Call

DON'T SAY "UNCLE," SAY "MICRO TAX" TODAY!

Individual.....\$ 250/\$na
Professional.....\$1000/\$na
Partnership.....\$ 750/\$na
Package.....\$1500/\$na

ACRS, depreciation, batch computing/printing of over 30 forms/schedules, and much more.

ORGANIC SOFTWARE®
TextWriter III.....\$111/\$25
DateBook II.....\$269/\$25
Milestone.....\$269/\$30

OSBORNE®
General Ledger.....\$ 59/\$20
Acct Rec/Acct Pay.....\$ 59/\$20
Payroll w/Cost.....\$ 59/\$20
All 3.....\$129/\$60
All 3 + CBASIC-2.....\$199/\$75
Enhanced Osborne.....\$269/\$60

PEACHTREE®
General Ledger.....\$399/\$40
Acct Receivable.....\$399/\$40
Acct Payable.....\$399/\$40
Payroll.....\$399/\$40
Inventory.....\$399/\$40
Surveyor.....\$399/\$40
Property Mgt.....\$799/\$40
CPA Client Write-up.....\$799/\$40
Mlg Address.....\$349
P5 Version.....Add \$129
MagiCalc.....\$269/\$25
Other.....less 10%

SOFTWARE WORKS®
Adapt (CDOS to CP/M).....\$ 69/\$na
Ratfor.....\$ 86/\$na

SOHO GROUP®
MatchMaker.....\$ 97/\$20
WorkSheet.....\$177/\$20

STRUCTURED SYSTEMS®
Business Packages, Call for Price

SORCIM®
SuperCalc.....\$269/\$na
Trans 86.....\$115
Act.....\$157

TCS®
GL or AR or AP or Pay.....\$ 79/\$25
All 4.....\$269/\$99
Compiled each.....\$ 99/\$25
Inventory.....\$ 99/\$25

SUPERSOFT®
Diagnostic I.....\$ 49/\$20
Diagnostic II.....\$ 84/\$20
Disk Doctor.....\$ 84/\$20
Forth (8080 or Z80).....\$149/\$30
Fortran.....\$219/\$30
Fortran w/Ratfor.....\$289/\$35
C Compiler.....\$174/\$20
Star Edit.....\$189/\$30
Other.....less 10%

UNICORN®
Mince.....\$149/\$25
Scribble.....\$149/\$25
Both.....\$249/\$50

WHITESMITHS®
"C" Compiler.....\$600/\$30
Pascal (incl "C").....\$850/\$45

"PASCAL"
Pascal/MT + Pkg.....\$429/\$30
Compiler.....\$315
So Prog.....\$175
Pascal/Z.....\$349/\$30
Pascal/UCSD 4.0.....\$670/\$50
Pascal/M.....\$355/\$20

"DATA BASE"
FMS-80.....\$649/\$45
dBASE II.....\$595/\$50
Condor II.....\$899/\$50
Access 80 Level 1.....\$249
Access 80 Level 2.....\$429
Access 80 Level 3.....\$679
Optimum.....\$749/\$50

"WORD PROCESSING"
WordSearch.....\$179/\$50
SpellGuard.....\$229/\$25
VTS/80.....\$259/\$65
Magic Wand.....\$289/\$45
Magic Spell.....\$269/\$25
Spell Binder.....\$349/\$45
Select.....\$495/\$na

"OTHER GOODIES"
Micro Plan.....\$419/\$na
Plan 80.....\$269/\$30
Target.....\$189/\$30
BSTAM.....\$149/\$na
BSTMS.....\$149/\$na
Tiny "C" Compiler.....\$ 69/\$50
Tiny "C" Compiler.....\$229/\$50
Nevada Cobol.....\$179/\$25
MicroStat.....\$224/\$25
Vedit.....\$130/\$15
MiniModel.....\$449/\$50
StatPak.....\$449/\$40
Micro B+.....\$229/\$20
Raid.....\$224/\$35
String/80.....\$ 84/\$20
String/80 (source).....\$279/\$na
ISIS CP/M Utility.....\$199/\$50
Lynx.....\$199/\$20

APPLE II®

INFO UNLIMITED®
EasyWriter.....\$199
Datedex.....\$249
EasyMailer.....\$128
Other.....less 15%

MICROSOFT®
Softcard (Z-80 CP/M).....\$298
Fortran.....\$179
Cobol.....\$499
Tasc.....\$139

MICROPRO®
Wordstar.....\$269
MailMerge.....\$ 99
Wordstar/MailMerge.....\$349
SuperSort I.....\$159
Spellstar.....\$129

PERSONAL SOFTWARE®
Visicalc 3.3.....\$159
Desktop/Plan II.....\$159
Visiterm.....\$129
Visidex.....\$159
Visiplot.....\$149
Visitrend/Visiplot.....\$229
Visifile.....\$199

PEACHTREE®
G/L, A/R, A/P, Pay or Inventory (each).....\$224/\$40

"OTHER GOODIES"
VU #3R (usew/Visicalc).....\$ 79
Context Connector (usew/Visicalc).....\$129
Micro Courier.....\$219
SuperText II.....\$127
Data Factory.....\$134
DB Master.....\$184
Charles Mann.....less 15%
STC.....less 15%

IBM PC SOFTWARE

Business/Med/WP Call for Price

ARTICLES WANTED..

INTERFACE AGE is seeking articles on computers in medicine for the September issue. The latest hardware and software for medical applications will be discussed. Specific application articles and case studies of how computers were implemented into medical practice (including office and accounting procedures) will be considered. Articles intended for this issue should be received no later than May 1 for consideration.

Other topics being solicited during 1982 include: educational applications, word processing, peripherals and interfacing products, home applications, tutorials and utility programs. Special emphasis is placed on business systems and applications.

Program listings should be no more than 60 characters wide, with no wrap-around lines. Unlined paper and a new ribbon should be used. Sample runs should also be included. In the article text, variables should be described. The system utilized in composing the program should be detailed — operating systems, language type and version, and any necessary peripherals.

The payment rate ranges from \$35-80 per published page.

Submissions should include an abstract and outline. Manuscripts should be typed or printed out double-spaced with one-inch margins. Minimum length is four pages, unless programs are included. Photos should be numbered and have a brief description attached to each. Tables, listings, etc. should be on separate pages and each should have a caption. Authors are requested to submit a statement of background and expertise.

The publisher assumes no responsibility for artwork, photos or manuscripts. No acknowledgement is made unless the submission is accompanied by a large stamped return envelope. A minimum of six weeks should be allowed for response; it is requested that authors do not phone for information about submissions.

The submissions should be addressed to: Editorial Dept., Interface Age, 16704 Marquardt Ave., Cerritos, CA 90701.

ORDERS ONLY—CALL TOLL FREE VISA • MASTERCARD

1-800-854-2003 ext. 823 • Calif. 1-800-522-1500 ext. 823

Outside Continental U.S.—add \$10 plus Air Parcel Post • Add \$3.50 postage and handling per each item • California residents add 6% sales tax • Allow 2 weeks on checks, C.O.D. \$3.00 extra • Prices subject to change without notice. All items subject to availability • ®—Mfgs. Trademark. Blue Label \$3.00 additional per item.

THE DISCOUNT SOFTWARE GROUP

6520 Selma Ave. Suite 309 • Los Angeles, Ca. 90028 • (213) 837-5141
Int'l TELEX 499-0446 DISCOSOFT LSA • USA TELEX 194-634 (Attn: 499-0446)
TWX 910-321-3597 (Attn: 499-0446)

VIC-20

The Friendly Computer

\$299.95



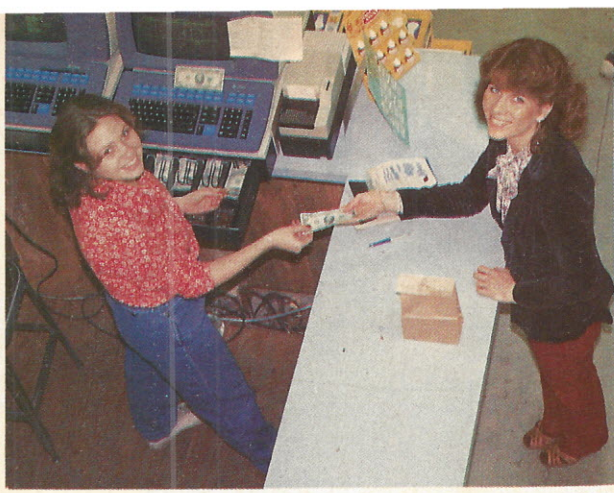
- Full Computer Keyboard
- 16 Colors/4 Sound Generators
- 66 Graphics Characters
- Memory Expansion to 32K RAM
- Includes Microsoft™/PET® BASIC
- Connects to TV or Monitor
- Recreation, Education & Personal Computing Programs
- Peripheral Equipment: Joystick, Paddles, Disk Drive, Printer, Cassette unit
- Telephone Modem for Communicating with outside Information Sources
- 4 Programmable Function Keys

For more information on the VIC-20's exciting
Space Games, Personal Software, and Programming capabilities,
visit your Commodore Dealer, or write:

VIC-20, Commodore Business Machines, 681 Moore Road, King of Prussia, PA 19406

 **commodore**
COMPUTER

CIRCLE INQUIRY NO. 18



The Retail Market Goes Computer

by Terry Benson



Photo courtesy of Pacific Coast Hardware, Long Beach, CA

Many retail managers see the business computer as too expensive and not very worthwhile for retail applications. The attitude is, perhaps, promoted in much editorial material related to the use of business computers. In general, typical ideas tend to place an emphasis on office applications. But there are just as many potential uses of a system in retail stores. The investment in such a system by retail outlets, be it point-of-sale (POS) or simply handling the books, can be quite cost-effective.

POS, accounting and inventory applications can each be incorporated into a computer to improve a store's profitability. The POS application would either interface with or replace the present cash register. Accounting packages will simplify the store manager's duties and probably provide more accurate reports. Inventory control is important to make sure that the proper items will be available when required. Real time or on-line inventory control can provide immediate updating directly from the cash register input, if that option is available. If no direct input is provided, daily entries can easily be accomplished through the console keyboard.

One of the most touted applications of the business computer is word processing, and many think that the retail business would not need such a system. But many stores make use of personalized letters to update their normal clientele with pending sales, or just to keep their customers up to date on the business progress. While it may be unlikely that daily letters are generated, it would still be cost-effective to have a word processing software package available that incorporated a mailing list merge feature, in order to rapidly correspond with all customers.

A general ledger program (or perhaps only a subset of an accounting package) could be considered for a retail application. Depending on the type of business, accounts payable and accounts receivable programs may support time payment plans for both supplier and customer. A general ledger program would almost certainly be beneficial for any retail store.

As a retail application grows or as more locations in the store become automated, additional terminals or systems can be added. For a small retail store, it may be appropriate to buy a single-user business computer, whereas larger stores may need a multiuser system. For stores with multiple locations, it may be desirable to incorporate modems, thereby allowing communication with the other stores, or even a central warehouse. This could allow immediate access to stocking or inventory information in the other locations. Through the computer terminal, order entry can be updated to minimize the delivery time of replacement items.

Perhaps one of the most valuable applications of the small business computer in a retail store is the ability to handle POS information. Many of the advantages are readily apparent for POS application, but they are usually thought to be too expensive for small retail applications. Let's take the example of a small store in a community shopping center where one cash register keeps track of all sales activities. This type of store could be a dress shop, a health food store, an auto supply store or a computer store.

In any of these applications, the part number of the item plus its price or other coded number can be stored in the computer. The label for the item can also be

printed by the computer. When a sale is made, the clerk or cashier merely enters the inventory item number, and the computer will do the rest. This can include printing a sales receipt with item description, totaling all purchases, adding the tax, and crediting the payments either by cash, check or credit card. In addition to the immediate output, the inventory stock list can be automatically updated. If a particular item ran below a minimum stock level, a day-end report could be generated to indicate which items need to be re-ordered.

In addition to the sales and stock information contained in the computer, a POS terminal could also be used to log employees on and off, keeping track of their hours, then printing a time card and/or the payroll check at week's end. It could also be used to keep track of commissions on sales for individual employees, which would help to minimize paper work, allowing each employee to be more productive.

Other applications are possible

While POS applications are the ones that first come to mind when discussing the retail business, they are not the only application of a small business computer, nor is it necessary to incorporate that feature. But with the POS method, a more complete, self-standing system could be implemented. The POS hardware is frequently no more expensive than a conventional stand-alone cash register. In fact, some of the newer cash registers are easily adaptable to a computer interface.

Let's see how the business computer fits into the retail operation. First of all, you would expect that normal business procedures would take place—but the retailer has additional problems. These problems can easily be handled in a large department store with several outlets because the off-site computer is necessarily large with a complete data processing staff to program and operate it. In the newer systems, all the cash registers interface to the computer and can verify customer credit, update inventory, and apply proper commissions to each salesperson.

This is not so in a small retail store—the “mom-and-pop” type of market. There are a few outlets at most. The entire staff may be sales people—no data processing or accounting departments. Maybe there is nothing besides the showroom and a small office in the rear to do the books, and the owner/manager probably ends up bookkeeping at all hours of the night.

Besides the accounting tasks, there is a myriad of paperwork associated with ordering merchandise and keeping track of inventory. Purchase orders and sales slips need to be reviewed and the sales transactions tallied. When enough sales of one item have been recorded, it's probably time to order some more—but is it? If a new model has just arrived and is selling quickly, it may be time to order some more. Maybe an out-of-fashion item should be dropped. How do you keep track? With all these forms, the manager may handle more paperwork than product.

Computers can help balance those time consuming books, simplify the tons of paperwork, and manage that income-producing inventory. Just buying one of the new personal computers, however, won't necessarily solve these problems. There has to be companion software to support the applications peculiar to the retail business—and that's part of the dilemma. There aren't many software packages devoted to the retailer but,

fortunately, many of the off-the-shelf accounting packages could well apply. General ledger, accounts payable, accounts receivable, and payroll should be fairly standard. Let's start with the POS support.

One of the few software packages designed to operate on a business computer and capable of handling the POS end of the business is CashMaster. About two years ago, Versa Computing (Newbury Park, CA) introduced this computer-based cash register software to operate on the Apple II computer. With many of the computer stores, like Rainbow Computing (Northridge, CA) using CashMaster, more Apple II users are becoming aware of its existence.

Minimum system is required

CashMaster (\$250) requires no more than what is usually considered a minimum Apple II system. An Apple II with 48K of memory, two disk drives, a TV monitor, and a 40-column printer are all that are required to not only replace a cash register, but also provide automated accounting capabilities. Additional hardware can be added to increase storage or provide time recording on transactions. Output control for a cash drawer is also provided.

Since CashMaster is a fully interactive software package, it provides a convenient human interface and simplified training of clerks. Information entered into the system during a sales transaction is continually displayed on the screen, thereby allowing convenient corrections prior to printing a customer's receipt. Item information is entered by part number, so the clerk will not have to enter the price of each item. Tax computation is, naturally, handled automatically and is continually computed during each phase of this transaction. A running subtotal is displayed and the balance is displayed during receipt of payment, after each partial receipt, if handled by multiple forms of payment. For cash payments, the customer's change is displayed. At the completion of the transaction, a customer receipt containing all transaction information will be printed.

The cash register operation is, perhaps, the major part of the system, but the daily closeout processing is just as important—and convenient. All of the daily reports that the store management needs are available with no more than a request from the operator. Each transaction of the day, fully detailed, along with the store summaries, can be provided.

Of course, the store management can also access the internal definitions such as item number, description, and price along with the establishment message that is printed on the receipt. All commands are menu-driven, giving the manager a choice of functions. The operation is interactive; that is, the computer prompts the manager, in English, what operations to perform and what disks to insert.

The only restrictions placed on the system are a limit of 1,000 items in the price list file and a maximum of 100 transactions of 15 items each for every transaction file. Both of these restrictions are easy to overcome. The price list can contain the most frequently purchased 1,000 items and the system will request the clerk to enter the price for those items not included. If disk space runs out because of too many transactions, the cash register can be closed out for each shift or smaller work period. Versa Computing can even customize the software for special circumstances.

For those business managers who wish to generate special application software, the CashMaster data formats are fully described. These features allow a programmer to write or adapt an accounting program that uses the data generated by CashMaster.

Now we get to the back-room applications, where all of the POS information is compiled. Although CashMaster itself does generate daily closeout reports, it does not support any general ledger activity. However, the output files from the system are compatible with a comprehensive series of accounting programs from BPI Systems (Austin, TX).

This company offers a complete business accounting system including general ledger, accounts receivable, inventory control and payroll. Each is available separately, but all systems can be fully integrated for a more complete financial reporting structure. The programs offered are suitable for retail applications, such as grocery stores, camera stores or other small retail businesses.

The company has incorporated generally accepted principles of accounting into each package. All systems have been thoroughly field-tested under actual operating conditions, and the company claims that the complete general ledger accounting system has been installed in many businesses in less than three hours. This is partly due to the well-written owner's manuals, which require no prior knowledge of computers, although they are written entirely in the language of business and accounting.

The general ledger accounting system is designed to reduce the difficult task of accounting and financial statement preparation. The system is designed to minimize operator entry and will alert the operator to data entry errors. The posting of ledgers, preparation of financial statements, and closing the books are all performed automatically. Training in the use of this package is enhanced by a demonstration disk that is furnished with the package.

Statements can be customized

General entries are handled by one program disk, which supports the entry of all data to the books. A separate disk is used to post and print all ledgers, including preparation of the balance sheet, the profit and loss statement and the general ledger. One of the features of the report generation portion of the program is that statements can be customized to suit individual businesses. The headers and account names can be modified as required, and certain sections can even be eliminated if they do not apply to the particular business.

Other ledgers available in the general accounting system are the accounts receivable ledger, accounts payable, payroll, cash distribution journal, the invoice register, cash sales journal and the general journal. Each supplementary ledger is prepared automatically, and will always be in balance with the general ledger controlling account. If the more comprehensive accounting packages are purchased, some of the ledgers would be eliminated from the general ledger accounting system.

The accounts receivable system will interface automatically with the general ledger accounting system and supercedes the accounts receivable ledger in that package. It also interfaces automatically with the inventory system, or it may be operated on a stand-alone basis. One data disk can contain all customer accounts, or for larger businesses, accounts can be spread over any number of disks providing for unlimited

capacity. The user has the option of specifying balance forward or open-item account detailing, each of which is explained fully in the owner's manual. The system automatically produces a detailed accounts receivable ledger, with an optional description of each invoice. Customer statements can be printed on customized forms, or the system will automatically print your company name and address. The accounts receivable system also provides an alphabetical listing of all accounts, cross-indexed to their account numbers, and will even generate a list of accounts by category. The system keeps track of past due accounts and will generate past due notices.

Identical commands are used

The inventory control system automatically interfaces with both the general ledger and accounts receivable systems and, in fact, has many identical commands to the other two systems to simplify the learning process. The user has the option of specifying the method of price inventory, then creating an account for each inventory item. Information on individual items can be edited at any time to update such things as minimum stock quantity or list price. The system allows the user to write purchase orders, and either print them on blank paper or on customized business forms. As merchandise is received into inventory, individual price labels can be printed. Listing of inventory items can be provided at any time, either on the printer or simply at the operator's screen for review.

The BPI payroll system, although designed to operate stand-alone, can also be merged with the general ledger accounting system. It provides compensation for salaried employees, hourly employees, and commissioned employees with a choice of commission plans. The payroll system can automatically print payroll checks, and will even prepare year-end reports, including W-2 forms. Up to nine deductions for each employee can be computed, and tax tables for the standard income taxes are built into the system. A payroll register with detailed employee payroll information for each pay period can be generated, including the payroll summary totals, gross pay, and deductions by general ledger account numbers. Other reports include earnings records, either month-, quarter-, or year-to-date, and a tax information report for the federal and state tax returns. The user can easily process even multi-state payrolls.

All BPI Systems packages are available for the Apple II computer. Some of the accounting systems have even been adapted for both the Commodore business computer and the new NEC small business computer. A recently introduced version of the general ledger system for use with the IBM personal computer now includes the capability to print checks. Each of the four business accounting systems discussed above sells for \$395. A job costing system suitable for the building industry is also offered at \$595.

While many of the users of the TRS-80 model III from Radio Shack (Ft. Worth, TX) have to locate their own software, one company has integrated software to support the POS retail application, with a cash drawer that interfaces directly to the model III. ICR Futuresoft (Orange Park, FL) has a complete hardware and software package to provide the user with a self standing POS terminal. The model CR-180 provides the cash drawer

hardware (\$449), along with the support software (\$500). The hardware includes an audible tone for data entry verification. The software package provides both POS and inventory control support. Communication with the cash register is provided through an RS-232 interface. Since no modifications are made to the model III, full Radio Shack service is supported.

The software operates under TRSDOS, and thus will simplify the user's system integration. In order to minimize user training, a master program menu displays the various functions available with the CR-180 software. All functions, from sales transactions to report printing, are self-prompting and error checking is performed as transactions progress.

In addition to the usual inventory functions, the system can print price labels and keep separate accounting for each type of sales transaction. A security code entry system prevents unauthorized cash register operation, and some functions are only available to the manager. One function allows the manager to modify the receipt message in order to customize the output. Each transaction is output to an optional receipt printer (\$425), but any printer will work with the system.

Assembling the right computer system and integrating suitable software for a retail application can be quite frustrating. There are a lot of business people willing to take the time to look around for the system, invest the necessary money and time, and learn how to use a business computer for any application. But for those who prefer someone else to do all of the work, there are some alternatives.

In particular, Lazor Systems (Sunnyvale, CA) has integrated a complete business computer system for retail applications. The system, The Retailer, is based on the company's well-established Lazor 5 and Lazor 30 models (IA Jun 80 and Nov 81). Not only has the company configured the hardware to support a small retail store, but also a comprehensive set of software has been integrated into the system to provide a complete turnkey application. The company even includes a cash register with the system so the entire point-of-sale-to-financial-report path is covered.

Many line items supported

The system is available in a floppy disk-based unit supporting up to 3,500 line items. A completely-configured system including processor, operator terminal, printer, cash register and two floppy drives sells for \$21,925. If you want to go all the way and end up with a 50,000 line item capacity, a 20M-byte Winchester hard disk (\$6,675) can be added. The small incremental cost seems to be well worth the increased capacity and higher throughput provided by the hard disk, since more users are opting for it.

One user of the Retailer started out with a floppy disk-based system in September, 1981 but decided to change to the hard disk, and add a faster printer to improve the system throughput. During this company's start-up phase, Lazor Systems worked closely with the store owners to accommodate their requirements. The customers indicate that they "have had, and continue to have, exceptional assistance from the staff at Lazor Systems." One of the primary points to evaluate when deciding on a system is whether it will handle your job in the manner you expect. For this reason, you should

work closely with the vendor, in order to have as many questions as possible answered prior to purchase.

The Retailer offers a complete software package that will automatically collect the data from cash register activity, and provide complete daily sales reports and inventory information at the end of each day. Simple operation requests will allow the user to print various reports as required. The register activity report shows the sales activity within the store by each cash register. The cost of sales report shows month- and year-to-date unit sales and cost of sales, plus gross margin by item and total. An inventory evaluation and gross margin report shows items on hand, on order, and backordered. It also summarizes each by units and dollars. The overstock-understock report shows items that are overstocked and those items that should be restocked, based on actual sales history. The on-order report shows which items are on order, how many, from whom and when due. In addition to the multitude of reports to assist the store manager, improved inventory control, purchasing and accounts receivable applications are also supported.

Along with the inventory and accounting assistance, the system will also increase the sales clerk's efficiency by providing item pricing either by request or automatically. It can also be used to indicate to the clerk whether the item is in inventory and where it is physically located. It can even verify customer accounts, account balance and limits, plus many other features selectable by the store manager.

The Retailer can support up to eight programmable cash registers through its central processor unit. One operator terminal display is available for the store

manager to interface with the system, and provides up-to-the-minute reports without requiring printed information. It is through this operator terminal that the store inventory is entered into the system. As new items are received, they can easily be added into the inventory list. The normal day-to-day sales and other dynamic data are usually entered through the cash register.

The system is easy to operate and is completely pre-programmed. It can generate numerous manager reports automatically, as selected by the user through a menu displayed on the operator terminal.

To provide security for the system, a user is required to enter a personal identification number, or password, to prevent unauthorized access to the cash registers and the system display. At the start of each day, each salesperson must identify himself by code number to gain access to a cash register. Normal training for any of the sales clerks usually requires less than one hour.

Integrates POS with data processing

The major advantage of a system such as the Retailer, which integrates both the POS and data processing activities into one system, is that costly re-entry of data is not required for the accounting and inventory applications. The software packages provided with the system accommodate data entry from the register and automatically update all of the information required for the generation of the daily, monthly, and yearly reports. In addition, extensive error checking and data validation are included, in order to prevent the time-consuming and costly errors that can sometimes creep into the system, and that are frequently not found until it is too late.

In order to illustrate some of the concepts mentioned above, let's review some actual retail applications of small business computers. The first example shows how a person with no prior computer experience can effectively apply a computer to a small store.

Operating two stores for a number of years from the heart of the San Fernando Valley, the Valley Book and Bible Stores, (Van Nuys, CA) have only recently decided to automate some of the accounting and inventory applications. The owners decided a little over a year ago that the volume of business was surpassing what could be easily handled through the normal manual methods. After investigating a number of alternatives, Dave Wilke, Vice President and Business Manager, decided that the best support for his application would be provided by Radio Shack TRS-80 model II desk top computer. The system includes a dot matrix line printer and a recently added second disk drive.

In addition to the hardware, several software packages were purchased from Radio Shack to support the bookstore application. Wilke soon found that few of the off-the-shelf programs would directly support his bookstore application. Since he had no previous computer experience, he was somewhat hesitant to tackle the task of adapting the programs for his particular requirements, but after attending a number of what he terms "excellent classes" from Radio Shack, he felt qualified to not only modify some of the existing programs, but also generate some of his own. His first encounter was an accounts receivable program that had several bugs. With his new found confidence in program support, he overcame the majority of the problems and is effectively using the accounts receivable program. Fewer problems were

TCS ACCOUNTING SOFTWARE

OSBORNE I \$269 XEROX 820 8"- \$239
5 1/4" - \$269

NORTHSTAR DD- \$259 XEROX 860 8"- \$239
QD- \$239

APPLE II Z-80 SOFTCARD, 80 COLUMN DISPLAY,
56K MEMORY \$259

ANY 8" CP/M SINGLE DENSITY \$239

General Ledger - detailed reports for company and departments comparative financial statements (month, YTD, previous year).

Accounts Receivable - instant customer account information (current and aged) with complete invoicing including open item and statement capabilities.

Requires MBASIC, 56K RAM, CP/M, 132 col printer. Includes source code, sample data and user manuals (540 pg.) CA residents add 6 1/2 % tax.

ALSO AVAILABLE for only \$99

Inventory - especially for retailers or wholesalers. Non-numeric part numbers, easy query with partial part number, re-order and financial reports.

Northstar and 8" formats only.

Accounts Payable - current and aged payables, complete vendor/voucher history, check writing, cash flow management reports.

Payroll - all types of employees. Multiple statements, user modifiable tax tables, W-2 and 941 printing (month, quarter and YTD totals).

Rocky Mountain Software Systems

P.O. Box 3282

Walnut Creek, CA 94598

(415) 625-1592

ATTENTION TCS SOFTWARE USERS

Subscribe to **TCS Debits and Credits**, a quarterly newsletter just for you. **TCS Debits and Credits** contains bug reports and corrections, enhancements to make the system more powerful or easier to use, information on compatible products, and helpful hints. Only \$20 a year.

If your accounting system is in the Dark Ages, you should talk to **Systems Plus**

Accounting Plus* brings up-to-the-minute accounting power to the microcomputer industry. **Accounting Plus** is an extremely easy-to-use, fully integrated eight-module accounting system. It includes complete data entry prompting, extensive error checking and one-time-only data entry features.

Accounting Plus features: General Ledger, Accounts Receivable, Accounts Payable, Inventory, Sales Order Entry, Purchase Order Entry, Point of Sale, and Payroll.

Accounting Plus is a comprehensive on-line system, with all transactions applied immediately, and results accessible without long delays associated with batch-type transactions.

Additional features include:

- Support of up to 65,000 records in most data files
- 8 levels of password protection
- Supports 6 preprinted forms
- Supports hard disk

If you are ready to enjoy solid software sales that create functional and easy installations, call **Systems Plus**, the microcomputer dealer's one-stop software house.

Our software operates under CP/M** or MP/M** operating systems.

Yesterday's dreams are available today, off the shelf.

1120 San Antonio Road
Palo Alto, CA 94303
415/969/7047



Systems Plus Inc.

* **TM of Digital Research, Pacific Grove, CA

**TM of Software Dimensions Inc., Citrus Heights, CA

DEALER DEMO SOFTWARE FOR 3¢ ON THE DOLLAR



Look at what you get for just \$295.

How can we afford to make available over \$9,000 worth of the finest software in the microcomputer industry for just \$295? Our answer is how can we afford not to?

We both know that professional demonstration is the best sales closer. It sells your computers and it sells our top quality software. That's why we'll send you all the business applications listed below for just \$295.

You'll also receive important promotional materials and our exclusive video sales presentation designed to help you make the sale.

Just give us a call, or drop us a card and we'll send you the whole package for just 3¢ on the dollar... we'd like to lose less, but we can't afford to.

FINANCIAL

General Ledger • Accounts Payable • Accounts Receivable • Payroll • Cash Receipts/Disbursements • Job Costing • Mailing List Management

MEDICAL/DENTAL

Office Scheduler • Patient Billing • Accounts Receivable • Insurance Forms

GOVERNMENTAL/EDUCATIONAL

Student Record Keeping • Student Scheduling • Fund Accounting

WHOLESALE DISTRIBUTION

Purchasing and Receiving • Inventory Control • Invoicing and Receivables • Sales Commission Reporting • Backorder Management

MANUFACTURING

INVENTORY CONTROL

Finished Goods Inventory Management • Parts Inventory Management • Parts Purchasing and Receiving • Bill of Material • Production Scheduling

All IMS business applications require CP/M* or MP/M* and CBASIC II* ... registered trademarks of Digital Research Corp.

Call for details (913)677-1137



ims

INTERNATIONAL MICRO SYSTEMS

6445 METCALF • SHAWNEE MISSION, KS. 66202

encountered with the accounts payable package, which "worked beautifully" in his application and is used to take the cash discounts available and sends up to 120 checks per month. Another program that has been very helpful is the Mailing List II program which, again, Wilke has modified for his application. Among other things, it is used to generate bulk rate mailing labels, but since no individual correspondence is generated, the bookstore has no word processing capability in its system.

An inventory control system has recently been incorporated for both store locations and it, too, has been customized with several new modules including a machine language sort. The inventory control system evaluates all of the 2,000 items on inventory and prints the most active 100 items. Since there is no POS application in this system, all inventory is handled through data entry at the operator terminal. When a new line is received, it is assigned a stock number which, along with information from the purchase order, is entered into the inventory program. The system then prints inventory tags, which include stock number, price, description, purchase order number, date, vendor and product type. The tags are attached to the item, then torn off when sold. All of the tags are saved up for the computer operator, who enters information from each tag into the inventory program once a week. The tags are mailed from the second store to the main store where the computer is located. A POS terminal has not been considered, due to its high cost. The present method seems to be handling the job quite well.

Adding to the system

The next step for the bookstore will be to add a general ledger program and perhaps even a hard disk. Wilke felt that with the quantity of floppy disks (12 or 15 now), he would be better off to have one of the hard disks offered for the TRS machine. Radio Shack's new 8.4M-byte hard disk system (\$4,495) may be a practical expansion peripheral for him.

Other features that he would look for if he were considering the system again would be the capability to support multiple terminals, with perhaps the ability to transmit information from the second store over telephone lines. He is very happy with his system, particularly since he can program some of his own applications, but he feels that he would be somewhat frustrated if he didn't know programming. He doesn't claim to be an expert programmer, but due to his classes, he has at least enough information to repair program bugs. Wilke attributes his success to the classes he took and says that "Radio Shack gives pretty good support."

Another user in a completely different field has applied an Apple II computer to an airline rental business. The system is used to print the rental tickets and generate reports on 10 aircraft, including maintenance and hours of use. The system consists of an Apple II with 48K of RAM, two disk drives, a printer for the rental tickets, and a second printer for statements. CashMaster is used with some additional customized software provided by an outside supplier.

This user (also totally unfamiliar with computers) suggests that anyone just getting started with a computer should know something about the computer prior to purchase. In fact, she feels that it would be helpful to know bookkeeping or even to have a course in computer-assisted accounting. □

APRIL 1982

JOHN STARKWEATHER'S

NEW NEVADA PILOT

\$149.95

DISKETTE AND MANUAL

For all CP/M systems. Works with Apple (softcard needed), TRS-80, North Star, Superbrain, Micropolis, Vector and

many other microcomputers. Needs 32K RAM, one disk drive and CRT or video display and keyboard.

- PILOT for Programmed, Inquiry, Learning Or Teaching.
- An excellent interactive language for education and office automation.
- Perfect companion for BASIC, COBOL and PASCAL to solve training and documentation problems.
- John Starkweather, Ph.D., creator of PILOT, wrote this version to meet all PILOT-73 standards and added many new features.
- New features include full screen text editor, commands to drive optional equipment such as VTR's & voice response units.
- Currently used in many college and progressive high schools.
- Use for interactive applications—data entry, programmed instruction and testing.

NEW NEVADA EDIT

\$119.95

DISKETTE AND MANUAL

For all CP/M-based systems. Requires 32K RAM, one disk drive and CRT or video display and keyboard.

- A character oriented full screen video display text editor designed specifically for program preparation.
- Write program in COBOL, FORTRAN, BASIC or similar languages.
- Features include single key commands for cursor control, scrolling, block moves, search and replace, tab setting and multiple file insertions.

NEVADA COBOL



\$199.95

DISKETTE AND MANUAL

For all CP/M or MP/M operating systems. Requires 32K RAM and one disk drive.

- Edition II of Nevada COBOL is based on ANSI-74 Standards.
- With 48K RAM, you can compile and execute up to 4000 statements.
- COPY statement for library handling.
- CALL...USING...CANCEL
- PERFORM...THRU...TIMES...UNTIL...paragraph or section names.
- IF...NEXT SENTENCE...ELSE...NEXT SENTENCE AND/OR <=> NOT.
- GO TO...DEPENDENT ON...
- Interactive ACCEPT/DISPLAY...
- RELATIVE (random) access files
- Sequential files both fixed and variable length.
- INSPECT...TALLYING...REPLACING.



ELLIS COMPUTING
SOFTWARE TECHNOLOGY

600 41st Avenue, Dept. I
San Francisco, CA 94121
U.S.A.

COD's WELCOME



(415) 751-1522

CP/M, MP/M and TRS-80 are registered TM's of Digital Research and Tandy Corporation.



WORD PROCESSING SOFTWARE

**Comparison of Programs
for the TRS-80**

by David D. Busch

It's ironic that personal and business computers are not particularly well equipped to handle the one application that is so universally useful—word processing. Nearly everyone writes letters, memos, reports and other work that can be streamlined through some form of word processing.

Microcomputers are very facile with numbers, once they have been translated into binary. They cannot handle words at all, unless they are encoded into a logical numeric system. As a result, a WP program must be very complex. Couple a near-universal application with a great demand for software, and the result is a bountiful array of program choices. These many options lead to a very competitive marketplace, low prices and a mad scramble to introduce new features that will afford a given package an edge over its rivals.

That's precisely the case with word processing software available for the TRS-80 models I and III microcomputers. The three programs reviewed here—along with a fourth that is soon to be introduced—represent the third generation of word processing software as we know it. These programs are Lazy Writer (SSM Marketing, Garden City, MI), Pensa-Write 2 (Pensadyne, Vancouver, Canada), and Electric Pencil II (IJG, Inc., Upland, CA). The final entry, SuperScripsit, is an enhancement of the popular Scripsit 1.0 program (Radio Shack, Ft. Worth, TX). Although this program did not arrive in time for a full review, we were supplied with a list of its more interesting functions.

Happily, the latest generation of WP software reflects the demands of users. We've been given just about everything we thought to ask for—and some features we weren't far-sighted enough to anticipate. Here are four of the best of the new breed, with a rundown on their features and idiosyncrasies.

Lazy Writer is proof that simple and powerful can coexist. It is among the easier word processing packages to learn. It's one of the few that allow you to sit down and begin entering text a few minutes after loading the software.

Two modes exist, Edit and Text Entry, and these can be toggled simply by hitting the BREAK key. A reminder of this feature constantly appears in a status line at the bottom of the screen. This line also shows the number of characters remaining in memory, and position of the cursor. Moving the cursor around with the arrow keys also forces an automatic entry into Edit.

In Edit Mode, a variety of functions can be invoked by single letter commands. For example, "l" will load a file, "s" will initiate a save routine, while "h" brings in a useful explanatory "Help" file. The commands "d" and "i" are used to delete and insert text. Although it is extremely easy to toggle back and forth between the two modes, the program allows summoning some of the edit functions (all of those named so far) from Text Entry. The CLEAR key serves as a control key, which should precede one of the single letter commands. This may be faster for quick inserts or deletions, or for a quick check of

Comparison of Features

Program	Electric Pencil II	Pensa-Write 2	Lazy Writer	SuperScripsit
Distributor	IJG, Inc. 1260 W. Foothill Blvd. Upland, CA 91768	Pensadyne 4441 W. 1st Vancouver, B.C. Canada V6R4H9	SSM Marketing 6250 Middlebelt Garden City, MI 48135	Tandy Corp. 1800 One Tandy Center Fort Worth, TX 76102
Price:	\$89.95	\$79.95	\$175	\$199
Built-in LC driver	Yes	No	Yes	Yes
Definable keys	No	No	Yes	Yes
Control codes	limited	Yes	Yes	Yes
Maximum document size (In 48K computer)	36K	19K	33K	estimated 30K
Disk directory	Yes	Yes	Yes	Yes
Help file	No	Yes	Yes	Yes
Memory	32K	32K	32K	48K
Headers/Footers	headers only	Yes	Yes	Yes

the help file.

However, much more powerful editing functions can be used in the Edit mode. Moving through the document is very fast. The cursor keys can be used, or the user can view successive "passes" by hitting the "a" key. Shift up arrow takes the cursor to the beginning of text from any point, while hitting ENTER twice moves it to the bottom. Fast moves in smaller increments—a word, sentence or paragraph—can be accomplished by striking a single key. Once the program has been used for a while, these moves become automatic.

While the lowercase "i" allows simple inserts of a few characters (or a word), this mode is rather slow, because the entire text is moved to allow space each time a character is entered. An uppercase "I" opens a large gap in the text, with only the single line following the insert displayed at the bottom of the screen. Blocks may be inserted much more quickly. Hitting ENTER makes any insertions permanent in the text. Until that point, however, additions may be canceled by pressing the BREAK key. This is a handy feature, but does require that you remember to hit that ENTER key before going back to Text Entry through BREAK. However, Lazy Writer does remind you, through a prompt at the bottom of the screen, to hit ENTER.

Deletions are similarly convenient, with "d" used to drop a character, "w" to delete a word, and "p" to eliminate an entire paragraph at one stroke. Blocks of material that have been marked using the block mode may also be dropped.

Other special features are available from Edit Mode. Typing "F" will invoke a prompt "Find what?" The user then types in a string to be searched for. If the first character of that string is a shift "@", the search will look for the string regardless of case—whether a character is upper or lower case will be ignored. Find and Replace can be used by separating the target and replacement strings with a "<". This is similar to the method used by Radio Shack's Scripsit.

Some types of repetitive editing functions (or any other task, for that matter) can be speeded up by using one of Lazy Writer's 10 user-definable multi-function commands.

To use this feature, press uppercase "x", select the key to be defined, then type in the command sequence.

These special function keys can also be summoned from text entry by pressing Shift BREAK. In addition, the commands can be stored on disk, and recalled at a later session, so that repeatedly used special function setups can become an integral part of a customized Lazy Writer program.

Block moves are accomplished by marking the text with parentheses from Edit mode. It is handy to use the "Remember Cursor" feature. The present cursor position can be marked by hitting "M", and a return to that point made by striking a lowercase "m".

A variety of special features would take an article of their own to describe. In a nutshell, here are some of the most outstanding:

- A disk directory is available from the program.
- An exit to DOS and a return to the program without destroying the text can be accomplished. In addition, there is a RESCUE/CMD program that can help resurrect some text when unwanted reboots or other problems occur.
- A built-in disk cataloging program allows compiling a list of directories of the users' disks.
- An RS-232 terminal program is built in.

To print a document, the user has the choice of setting all print formats from a printer menu (such as for a simple letter or other document that may not be used again). You may also embed formats in text, similarly to most word processors. Page width, length, centering (not found in all software) and reverse indenting are available, along with some more unusual commands, such as boldface, graphics characters and a "stop" command to halt the printer, for example, to change type fonts.

One nice feature is the "acceptable overflow" command, which allows some pages to be a few lines shorter than the specified page length. The program will then end the page at a paragraph end, rather than print one or two "widowed" lines at the bottom of the page.

ASCII control codes can be embedded, the program may be instructed to chain files together, and print one

Financial Planning...

from *SuperSoft*

SCRATCHPAD: SUPERSOFT'S ELECTRONIC WORKSHEET

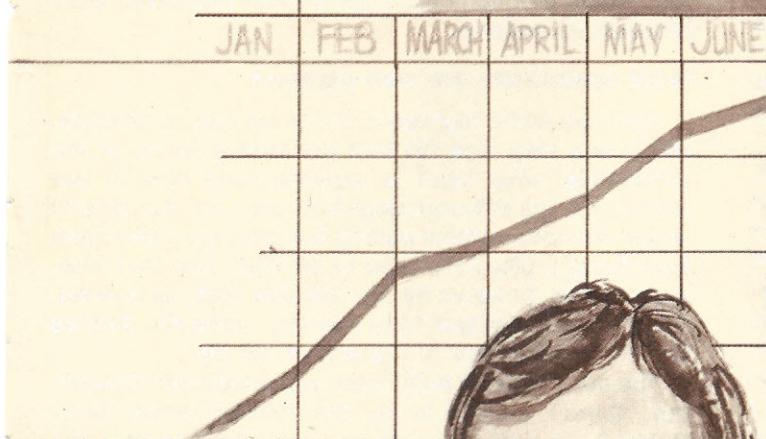
ScratchPad is a user-interactive data modeling program suitable for financial planning or any general purpose modeling. Whether you are an executive, a researcher, or planning the family budget; you will find ScratchPad an invaluable tool in giving you the numeric relations you need for sound decision making.

ScratchPad provides for labels and corresponding numeric data entries cross-referenced by row and column. Data entries are then defined as dependent variables in a user-created algebraic formula. You can now quickly see how changes in one or more variables affects others.

ScratchPad includes the following

- Multiple screen splitting which allows two or more sections of the worksheet to be viewed simultaneously.
- Both immediate and deferred calculation modes allowing calculations to be either made as data is entered or deferred until later.

- Flexibility in entry and editing functions so that data can be entered or changed easily.
- Column widths are variable.
- Portions of the worksheet not currently being viewed can be quickly brought to the screen for either single or split screen viewing.
- Any portion of the worksheet can be printed as hardcopy at the user's discretion.



STATS-GRAPH: SUPERSOFT'S STATISTICAL DISPLAY PACKAGE

Stats-graph performs statistical analyses of user data and displays the results in graphic form.

Graphic formats include:

- Pie Graph
- Bar Graph
- Scatter Graph

Statistical Analyses include:

- Mean
- Median
- Minimum and Maximum values
- Standard Deviation
- Regression Analysis

Stats-graph is an easy-to-run, user-interactive program that presents valuable and often complex information in a concise and easily understood form.

U.K. and Europe:
DIGITAL DEVICES
134 LONDON ROAD
SOUTHBOROUGH, KENT
TUNBRIDGE WELLS
TN4, OPL
ENGLAND
Tel.: Tunbridge Wells (0892)37977/9
Telex: 95582

Japan:
ASR CORPORATION INTERNATIONAL
3-23-8 NISHISHIMBASHI, MINATO-KU
TOKYO 105
JAPAN
Tel: 03-437-5371
Telex: 0242-2723

DATA-VIEW: THE EXECUTIVE ORGANIZER

Data-view is an easy-to-use, free formatted system for organizing information. It can be used as an electronic filing cabinet, an automated date book, or a computerized listing device. Insertion and retrieval of information is both simple and quick. Data may be retrieved by file, string, or key word, and any type of information can be stored.

ScratchPad:	\$200.00
Stats-graph:	\$200.00
Data-view:	\$200.00
Total Package:	\$500.00
Manuals only:	\$ 15.00

Software available for virtually all CP/M systems. Specify your system.

Available from fine dealers everywhere, or directly from:
SUPERSOFT, INC.
P.O. BOX 1628
CHAMPAIGN, IL 61820
217-359-2112 Telex: 270365
Technical Hot Line: 217-359-2691



CIRCLE INQUIRY NO. 81

First in Software Technology

long document after another. Headers and footers may be specified for odd or even pages only, or on every page, as desired. It is possible to save text to disk formatted exactly as the printer would see it. This feature makes it possible to send someone else—who may not own Lazy Writer or any other word processing program—a document. It can then be printed using the DOS PRINT command, with no need for a program.

Pensa-Write 2, at \$79.95, represents a bargain in an age when word processing software with these features is selling for \$100 to \$200 (and up). Text entry and editing is logical and easy to do, once the fairly complex layers of command have been learned. Those who have already learned a simpler word processing system, or who must switch back and forth between one system and another (at the office and at home, for example) may be confused. In addition, this system does not lend itself to quick and dirty work. It more closely resembles a dedicated word processing station that must be initialized at the beginning of a session.

For example, to use the program with the TRS-80 model I, it is first necessary to load an upper/lowercase driver routine. None is provided with the program, and I have found several that do not work correctly. The ULCDVR that Radio Shack offers with its lowercase modification for the model I will work satisfactorily.

Next, the user must enter the month, day, year, hour, minutes and seconds. The step cannot be bypassed, but it can be sped up by hitting ENTER six times instead of inputting the requested information. At this point, Pensa-Write 2 is still not ready for text entry. The program initializes in its COMMAND mode, which has ten basic sub-commands, one of which is EDIT. Enter EDIT to go to the next level, which has nine sub-commands of its own. One of these, MOD, takes us to yet another mode, with 20 more commands. These are single-character commands. ENTER "A" (for ADD), and you are, at last, ready to begin entering text.

All these commands must be entered in all caps mode. Other WP systems automatically switch input to all caps, except where lowercase is appropriate, as in Global Search string entry, or text entry. With Pensa-Write 2, you must either hold down the shift key while entering commands, or switch to all caps mode (usually shift O) every time you enter a command.

System tries to save memory

This command tree allows a great deal of flexibility, but can be somewhat confusing and vexing when a function is desired that does not exist in the current command level. To save memory, only some of the functions will be resident in the system at any given time. It is sometimes necessary to load a file from disk in order to go on to the next level.

When ADDing text, if the user wishes to save the current file to disk, it is necessary to escape from ADD mode, go back to MOD, exit from that to EDIT, then back down the tree to WRITE. To make things interesting, each command level has a different procedure for leaving it. Shift up-arrow will force an exit from one of the single level commands back to MOD. To get out of that mode, you must enter X. Leaving EDIT is accomplished by entering END, and going back to the top level achieved by EXIT.

To see how this affects working operations, compare the procedure needed to make periodic saves of updated text during a long entry session. With SCRIPSIT, hit <BREAK>, "S", <ENTER>. With Pensa-Write 2, hit Shift Up Arrow, "X", <ENTER>, END,<ENTER>,WRI,<ENTER>,filename,<ENTER>, password (or just <ENTER>),<ENTER>,drive number. Then you get to make your way down the command tree back to ADD to continue.

Potential users should be aware of the way the program works, but should not be entirely put off. All of these procedures become almost second nature after you've used the program for awhile. The command structure seems confusing for a newcomer to the program, and learning the system may take longer. The necessity to bounce back and forth among levels does require additional time that may be undesirable. Outside of those two factors, I don't think that the configuration of the commands will bother most users after they become accustomed to them. After a few days, I zipped right along, happily taking advantage of some of the other powerful features of the program. In fact, some functions work faster than with other word processing systems.

MOD commands are well-planned

Here are some highlights of the various commands. HELP is a very nice file that provides a listing of the commands, what input is expected and how to use each. KILL (as differentiated from KIL) can be used to erase disk files without exiting the program. DIR allows specifying a directory read of all files, just text files, system files, program files or invisible files, as desired. DES clears out all text from memory, while KIL deletes text from the cursor to the end of the file.

The commands in MOD were especially well thought-out. Cursor control is by the familiar arrow keys. Holding the shift key with an arrow key doubles the speed of the cursor. In addition, hitting the "W" key, then a right or left arrow key will cause the cursor to jump one word. Entering a "B" or "E" will move quickly to the beginning and end of the text, respectively. (H) (home) returns the cursor to the upper left corner of the screen.

Two "insert" type commands are available. By moving the cursor with the arrow keys to the desired point and hitting "I", the text remains on the screen, and small insertions are made. Characters to the right and below the cursor move to accommodate the addition. As in all word processors, this process can be somewhat slow, because of the movement that takes place in memory. The program offers a second insert mode, "A" (ADD). Once the cursor is positioned, and "A" invoked, the screen clears, and large quantities of text can be entered as fast as the typist can strike the keys. Exiting from ADD (shift up arrow) brings the full text back to the screen, ready for deletions, or moving to the beginning or end of the file.

I especially liked the block move function. With several word processing packages I have used, block moves are accomplished with some awkward exchanges of blocks, hitting many keys just to make a simple move. With this program, simply move the cursor to the beginning of the block to be moved, hit "LEFT paren" (Shift 8), move to the end of the block and "close" the parentheses with shift 9. A pair of graphics blocks will

INTRODUCING CALCSTAR.TM ANOTHER INDISPENSABLE BUSINESS PROGRAM FROM MICROPRO,TM THE WORDSTARTM PEOPLE.

CalcStar software eliminates the need to use ledger paper ever again. It turns your video screen into a "window" on a giant electronic ledger sheet, with up to 600 entries arranged the way you want. Then, by inserting formulas into CalcStar, you create financial models that simulate the future numerically. And predict the outcomes of your business decisions.

When you notice what CalcStar can do for your business, you'll wonder how you ever got along without it. (If you're now a WordStar user, you probably already know the feeling.)

The MicroPro bonus. Like WordStar, CalcStar is packed with innovative features that make it versatile and easy to use. Features like Automatic Forms Mode, which lets an inexperienced user enter data into a spread sheet quickly and with less chance of error.

CalcStar's greatest innovation is its ability to join with WordStar. Which means, for example, you can use WordStar's printing options, like boldface and underlining, to dress up financial documents. And you can insert sections of CalcStar's spread sheets into your WordStar documents.

This kind of flexibility should come as no surprise if you're already familiar with the MicroPro software family—a line of programs designed to work together to multiply your problem-solving power. Visit your MicroPro dealer to find out just how big a difference *all* our products can make in your business. We predict you'll discover it's not just CalcStar or WordStar that's indispensable. It's MicroPro.

Presenting CalcStar—another standard-setting software product in the WordStar tradition.

CalcStar is MicroPro's new electronic spread sheet and financial modeling program—a sophisticated, yet easy to use, calculating and planning tool for CP/M®-based computers.

The ultimate electronic spread sheet.

CalcStar calculates solutions to complex numerical problems in business and finance. Helps you make budget plans and sales forecasts with greater speed and accuracy. And projects figures into the future to answer the "what if" questions you face in business.

And CalcStar also has a unique MicroPro advantage: It joins with WordStar to combine spread-sheet and word-processing capabilities in several powerful ways.



A glance at CalcStar features

Runs on CP/M version 2.0 or above, with 80-column screen, addressable cursor, and at least 48K memory. 56K or more is recommended for fullest utilization.

Highly user friendly: Call up full screen of help or use help menu. WordStar-like cursor commands. User's guide shows you the basics. Install from menu OR a WordStar file.

Stores formulas and formats along with data, for convenience and less chance of error.

Math functions include average, minimum, maximum, logarithms, exponents, and regression analysis.

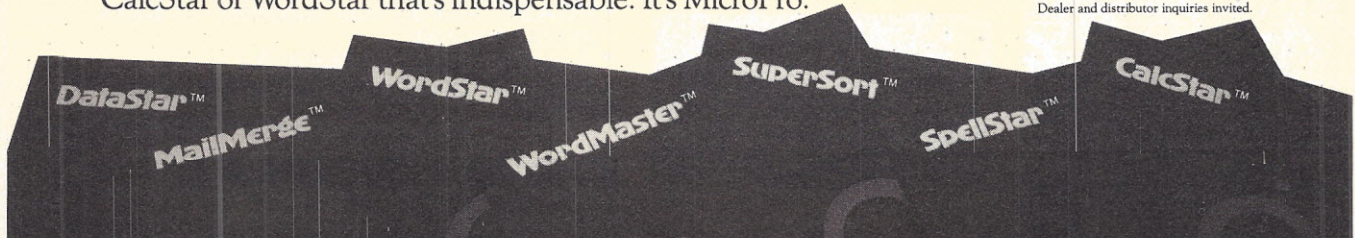
SOFTWARE
THAT MEANS BUSINESS

MicroProTM

INTERNATIONAL CORPORATION

1299 Fourth Street, San Rafael, California 94901
(415) 457-8990; Telex: 340-388

CP/M is a trademark of Digital Research, Inc.
Dealer and distributor inquiries invited.



frame the block to be moved. Then position the cursor at the exact point at which the block is to be inserted and strike shift O. That's all there is to it. There's no labeling of blocks with letters, or need to unmark them either.

This is less powerful than systems that use labeled blocks, which can be exchanged and moved around much more flexibly. However, in actual use as a full-time writer, I find I do more simple block moves to a new location than multiple block rearrangement. I like the fewer keystrokes and simpler operation of this feature in Pensa-Write 2.

Text is deleted by positioning the cursor and hitting "D". One character to the right (not left as in other systems) will be gobbled up. Shift "D" will work twice as fast, while "W" followed by "D" will delete a whole word. Logically, Shift "W" + "D" really swallows up undesired verbiage.

Finding, searching and replacing are very easy with this system. One nice touch not found in all other WP programs is that Replace can be Global or "operator" prompted. One can tell the program to replace all occurrences of a word in text, or ask that each be presented in context for Y/N decision. The system will also just look for strings, which is a fast way of jumping from one section of a long document to another.

When the print module is loaded, the system displays the default values (which may be changed permanently). You may also embed other print format codes in the document itself. These include the usual page length, margin, justification and spacing instructions, as well as allowing the sending of non-printing ASCII printer control codes. Those with Epson, IDS or other printers that respond to these will appreciate being able to change print sizes and perform other controls from within a document.

Files can be linked through the format lines, so that when one file is printed (in a very long document), the next will begin immediately. Header/footer control is also very flexible, to the extent that it is possible to specify a different format for page one. "Wait at page end" (to allow printing single cut sheets of paper) is another standard feature.

In addition to the above, the program had some valuable quirks. It has a very useful status line at the top of the screen, which gives information such as characters used, memory remaining, number of words and whether or not the file has been saved yet. That could be a lifesaver for those who forget to save their long files

from time to time as they input text. If you try to write over an existing file, the system will ask you if you are sure you want to do this.

Electric Pencil II, version 2.0Z, is an upgrade that will prove very easy for users to adjust to. Very little of the general operation has been changed from the original release of Electric Pencil. The text entry commands remain the same, although some unneeded functions have been eliminated.

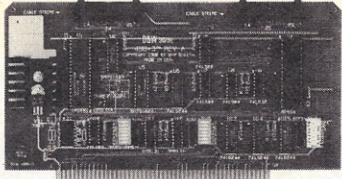
A complete, easy-to-use system menu has been enhanced, with file handling functions invoked by the normal commands (LOAD instead of DL, CLOAD instead of R, for example). A separate Print menu has been established. It is no longer necessary to install a control key—CLEAR is used for that purpose.

Text entry and editing are fast and simple. There is no need to go from one mode to another. The text remains on the screen at all times, and whether the operator is performing entry to editing is determined by the position of the cursor and the command keys that are pressed. The usual arrow keys control cursor movement. In addition, the cursor may be homed (Control Q), moved to the beginning or end of the text (Control B and E), or transported a page at a time through other codes.

The Control D or Control I key may be used to insert a character, while Control H allows adding entire blocks of text, similar to Pensa-Write 2 or Lazy Writer). Characters, lines, or blocks may be deleted with dedicated control keys of their own. The shift up arrow is used as a block marker character. Because blocks may not be labeled with, as with Lazy Writer or Scripsit, this system is a little less flexible in moving material around in a document.

Global search is available, including "wild card" searches for partial character string matches. I found this system to be particularly convenient to use, because the Replace Function is automatic. When the user keys in a string to search for, the program asks for the string to replace it with. If Search only is desired, then the ENTER key is pressed, and no replacement takes place. Pensa-Write 2 also has something similar, but requires separate keys for Search, and Search and Replace. Both Lazy Writer and Scripsit 1.0 require extra keystrokes. It is possible to do "partial" global search and replacements by moving the cursor past a word that should NOT be replaced, then hitting Control C to continue the search.

One nice extra feature is the dictamatic function, which allows controlling a cassette recorder's start



THE 488+3 IEEE 488 TO S-100 INTERFACE

IEEE-488

- Handles all IEEE-488 1975/78 functions
- IEEE 696 (S-100) compatible
- MBASIC subroutines supplied; no BIOS mods required
- 3 parallel ports (8255A-5)
- Industrial quality; burned in and tested
- \$375

[Dealer inquiries invited]

D&W DIGITAL
1524 REDWOOD DRIVE
LOS ALTOS, CA 94022 [415] 966-1460

S-100

and stop by pressing shift enter. This is great for transcribing dictation.

Unlike most third generation word processors, the program does not have a status line on the screen at all times. However, the system menu can be checked at any time by hitting Control K. This menu shows the words used, free memory, plus commands available. Those with Exacton stringy floppies should note that Electric Pencil II can be supplied in a stringy floppy form, and supports @SAVE, @LOAD, and @NEW commands. A disk directory is available from the system menu, and only Pencil files (or all files) may be seen, as desired.

As in past releases of Electric Pencil, it is necessary to move the cursor to the beginning of the file, in order to save the entire file to disk. However, a warning that only part of the text is being saved is displaced in the system menu. This should help minimize what many feel is a shortcoming of the Electric Pencil system.

Another difference between the old Electric Pencil and other word processing systems was that it was not possible to embed print format instructions in the document. Instead, the default values were used, or new margins, page lengths, etc. could be set from the main menu. That has been remedied with Electric Pencil II. Headers are possible, and may be changed within a document as frequently as desired. Footers are not implemented. Only a limited number of printer control codes may be sent, and embedding ASCII codes in the text is not allowed.

SuperScripsit was not available at presstime, but the program should be in release by now. Like Scripsit 1.0, it promises to be a simple, powerful program with some of the failings of its predecessor resolved.

For example, SuperScripsit will allow viewing the disk directory, underlining, boldface, super and subscripts and pause for font changes or insertions from the keyboard. At last, those with all-Radio Shack hardware/software configurations will be able to take advantage of the capabilities built into Radio Shack's own printers.

Half-line spacing is allowed, as well as one header and footer per document. Disk-to-disk file copying is now possible.

For me, the big news is the ten user-definable keys, which can each store 127 characters worth of phrases or commands. I also liked the fact that documents can be preformatted and displayed on the screen exactly as they will appear when printed. I found it irksome to print out a document with Scripsit 1.0, find a one-line widow, and have to go back and insert a forced end-of-page marker.

This version of Scripsit is more menu-oriented (which should help beginners), and has a help list to explain commands. Even with these aids, Radio Shack still provides its cassette self-study course to ease first-timers into the various commands.

These WP packages represent what may be the final generation of word processing software. In the future, we'll see comprehensive "information processing" systems that include integral interfaces to dynamic spelling and grammar checkers, thesauruses and other reference works. For the present, there is a great deal that can be done with word processing programs like these. □

APRIL 1982

RELIABLE SOFTWARE

IN ITS 7th SUCCESSFUL YEAR

NEW: MAXILEDGER

BILL OF MATERIALS	\$350
MAXILEDGER	\$350
ORDER ENTRY	\$350
MICROLEDGER	\$140
ACCOUNTS PAYABLE	\$140
ACCOUNTS RECEIVABLE	\$140
INVENTORY CONTROL	\$140
PAYROLL/PERSONNEL	\$140

Inquire for prices on other versions

Also Available for:

IBM, NEC, OSBORNE, XEROX
TRS-80 MOD III, II, I, ATARI,
APPLE, VECTOR, EXIDY,
DYNABYTE, MICROSOFT
CP/M®, CBM DOS 2.0,
MICROPOLIS, SUPERBRAIN

CP/M is a trademark of Digital Research

ASK US ABOUT MICROTEACH

- Simple effective programs designed for your machine
- Step by step instructions, beneficial to the novice as well as to the more experienced user, accompany every program
- The Source Code is provided with each program
- You will have a product you'll be able to use from the day you receive it and as your company grows in size
- One phone call will get you same week delivery
- Best of all our programs are interactive.

THEY ALL WORK
TOGETHER!!

See your dealer or order direct
for a full line of **COMPUMAX** Software

COMPUMAX

P.O. BOX 7239, MENLO PARK, CA 94025 (415) 854-6700

CIRCLE INQUIRY NO. 20

Product Highlight: Dynabyte 5710



**Multiuser
microcomputers—up to
19MB Winchester/Tape
from \$8,995***

For performance

Enhanced CP/M-MP/M or OASIS multiuser operating system for the speed of a mini with the ease of a micro—supports up to 8 terminals and 16 printers.

For Winchester/Tape performance, you just can't buy a better multiuser microcomputer than the Dynabyte 5710. Take our 5 1/4" Winchester disk drive. Either 12MB or 19MB capacity with a removable 17MB Cartridge tape drive.

Packaged in a single, compact, table-top box.

See for yourself

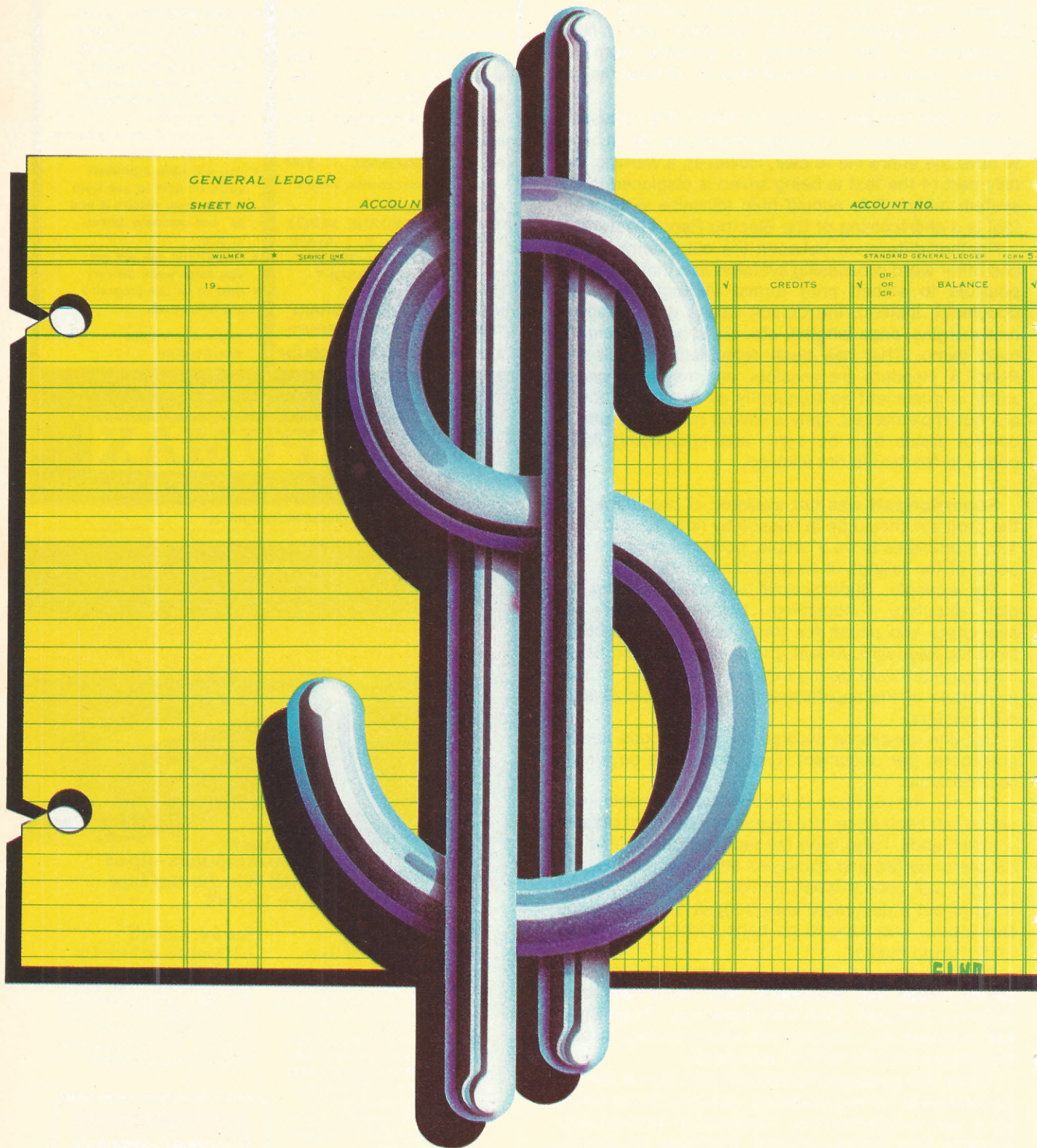
All Dynabytes are backed by Dynabyte's engineering expertise and reputation for high quality. We'd like to tell you more. Call now! 800-538-3939. In California, 408-263-1221 or write Dynabyte, 521 Cottonwood Dr., Milpitas, California 95035.

DYNABYTE
Business Computers

*5710-A2-64K, 12MB Winchester 17MB Cartridge Tape—\$8,995 (list)
5710-B2-64K, 19MB Winchester 17MB Cartridge Tape—\$10,450 (list)

CP/M; MP/M—trademarks of Digital Research, Inc. OASIS—trademark of Phase One Systems, Inc.

CIRCLE INQUIRY NO. 34 INTERFACE AGE 83



General Ledger Software In The Balance

by Carl Heintz, CPA

With this issue, IA launches a comprehensive survey of the vast array of available business software for microcomputers. In this and succeeding issues, we will focus upon software ranging from general ledger to statistical analysis, and for such diverse machines as the TRS-80 and the Alpha Micro. Our intent is to present a broad outline of the available software, with a meaningful comparison guide that our readers can use to aid in their selection of the "right" package. Our first survey focuses upon general ledger packages.

Future months will spotlight: accounts receivable/payable; financial planning packages (i.e. VisiCalc); payroll and cost accounting; inventory and order entry; word processing/editors; integrated accounting packages; graphics packages; data base systems and code generators; tax programs; programs for the medical/dental/veterinary fields; programs for CPAs and attorneys; programs for wholesale distributors; communications software; business programs for the Apple; business programs for the TRS-80 (I, II, III); and business programs for CP/M.

What are the important features to look for in a general ledger package? The answer depends upon many factors, not the least of which is the nature of the particular application. Still, there are some common areas that should be considered before any choice of a particular package is made. Let's discuss these features in detail, in an effort to shed some light upon how a micro user can make a wise decision.

To begin with, don't start out by attempting to fit your business to the software—begin by defining what it is you need. The best way to do this is to get the undivided attention of your accountant or company CPA for a few hours.

Some of the issues that should be discussed are:

- 1) Will the general ledger be stand-alone or integrated with other packages, such as accounts receivable/inventory and payroll?
- 2) What kinds of reports will be required? Will the system be required to report on divisional activity, or consolidate various company branches? What kind of account structures will be necessary?
- 3) What will the volume of transactions be? What kind of storage capacity and equipment requirements will present themselves? Will the user buy a new system, or will existing equipment be used?
- 4) What is the degree of user sophistication? Will extensive hand-holding and user training be needed?

These are obviously open-ended questions. There are no correct answers—and each user will necessarily be a bit different. However, they will provide a starting point in the choice of a satisfactory program.

Once the preliminaries are settled upon, it is time to begin the task of evaluating individual programs. In our

software survey, we chose a number of factors that we felt were indicative of program quality—regardless of its particular design. For practical reasons, our list does not include two of the most important attributes. The first is ease-of-use, which can only be judged by a user with an installed system. We strongly recommend that a user and his accountant try the software on a system for an hour or so before purchasing it. Only then can you be sure that it runs, that the data entry sequence is comfortable, that the operating protocols are logical, and that the system will “fit in” with other programs used in the installation. Since just about every installation is unique, it is important to demo the package on compatible equipment. (For example, don’t demo a program on a machine with a hard disk when you have only a 100K single density floppy on your system.)

The second attribute we couldn’t include here is the nature of generated reports. When evaluating software, get sample copies of all the reports and take them to your accountant. Ask for guidance as to which reports seem to be the best. Look at the readability, inclusion of detail and suitability to your business. Don’t expect any report to be perfect—all programs represent a number of compromises.

Some of the other attributes that our survey was unable to rank were operating speed, freedom from program bugs, and internal program controls and integrity. These are factors that can only be ascertained from actual hands-on testing.

When we began our survey, we expected to find hundreds of general ledger programs on the market (well, at least several dozen). To our surprise, there really aren’t that many programs sold on a national basis, apparently because there aren’t that many vendors who have decided to support their programs, or who have approached marketing from other than a regional basis. We uncovered many vendors who had written their own programs for their hardware customers. In many cases, these vendors had used the Osborne programs as a starting point, or had downscaled programs from minis.

Documentation is the beginning point to evaluate a general ledger, or any other accounting package, for that matter. Our questions centered on some key points in the manuals. For example, did the manuals have checklists covering the operation of the programs? We wanted to determine whether sample CRT screens were shown in the manuals as an indication of whether the manual fully explained the program operation.

Best documentation includes extras

Some programs include sample hard-copy input forms to help the user with implementation. While such forms are not a critical part of the documentation quality, we polled software vendors on this point, because the best software documentation that we have seen generally includes such extras. Another feature often seen in better program documentation is a section explaining a bit about accounting, helping the user to understand more about how accounting principles interface with the program.

A good indication of the care with which a program manual is put together is whether or not the writer has gone to the trouble of indexing it, or including a table of contents. Also, no documentation would be complete without copies of sample reports. One feature that we

expected would get a higher response was our query about program flowcharts. Sometimes a flowchart can be the key to a full understanding of a program and its interrelated parts. Very few of the respondents included such documentation.

When looking at a program manual, other items to look for include: discussion of the actual workings of the program; descriptions of the files used, their structure and contents; trouble-shooting guide, with symptoms, causes and solutions; and error-recovery procedures and safeguards.

The issue of source code has been a sore topic for many software vendors. Many programs are written in interpretive Basic, such as Microsoft Basic. In these programs, the user is provided with program code that is human-intelligible and can be modified. Software

Most users want to employ their micros for more accounting functions than just general ledger.

vendors often provide programs in non-intelligible code, which is machine-readable only. The programs are generally written in CBasic or a compiled version of Microsoft Basic. Modifications are virtually impossible, and the user must hope that the software company stays in business for the life of the program. Is this really a critical issue for the purchaser? In all but the most simple of programs, probably not. If the user plans on making extensive software changes, it is generally better to start fresh. Patches to existing packages more often than not result in disasters. With the current wide availability of programs such as Formula or Pearl, which write applications code (or data base managers such as Dbase, which replace them), the choice to users is now much larger. Our advice: don’t plan on buying a package and modifying it.

Most users want to employ their micros for more accounting functions than just general ledger. Our survey revealed that most vendors of general ledger software realize this too, and offer additional packages that (together with their general ledger packages) form a complete series.

The “big-5” software packages include: general ledger, accounts receivable, accounts payable, payroll and inventory. Most vendors replying to our survey had these packages, many of which were integrated with the general ledger system. In some cases, this integration allowed the user to update the general ledger from the other applications packages—i.e. the receivables package creates an automatic journal entry to the general ledger package for the cash receipts entered. The only danger in this sort of interfacing is the possible lack of audit trails. Sometimes a package will update

Offering CPAid

General Ledger II by CPAids, (Kent, OH) is billed as an accountant's "write up and payroll" package. It is designed for the CPA who has monthly clients and wishes to computerize the process of preparing his books and records. There is no reason, however, why the system cannot be used by small businesses, as well.

The system is supplied on CP/M compatible disk. It requires at least 48K of RAM and a two-disk system with a storage capacity of at least 315K per disk. The programs are available in either compiled or interpretive Microsoft Basic. A CRT with an 80 by 24 capacity and direct cursor positioning is required, as is a printer with at least an 80-column capacity.

The programs consist of several modules that include general ledger, payroll, depreciation, amortization and utility programs.

The manual is quite complete, and includes a flow chart of the program steps, a complete set of installation instructions and some helpful examples. The company producing the software has been around for a while and is similarly helpful—knowledgeable and eager to help users achieve a successful implementation. The programs were written by Andy Rosenberg, who, as a practicing CPA himself, knew what accountants were looking for in a microcomputer program.

One way to gain an insight into the architecture of any set of general ledger programs is to focus upon the manner in which the system uses the chart of accounts. For some reason, this has always been a difficult area for programmers and accountants to agree upon. The programmers use the chart of accounts in a different way than the accountants generally do, and in no other area are the differences between a manual system and a computerized one more likely to be apparent.

The scheme used by this program is a variation on a very popular method of handling the chart of accounts. Basically, the accounts (of which there can be a maximum of 400) consist of an eight-digit code in the format: "ABCDE.FGH". The first digit, A, is used to indicate the type of account it is: assets, liabilities, equity, revenues, expenses or non-operating revenue.

The second and third numbers (B and C) are used to indicate the account. Thus there may be up to 100 asset accounts, etc. The fourth number, D, is used to indicate a department number. There can be a total of 10 departments possible in a system. The fifth digit, E, is used to indicate the manner of placement of the account in the financial statements. A bit of explanation is in order on this point. The chart of accounts includes a number of accounts that contain no balances. These dummy accounts are used to format the financial statements. In other words, the assignment of the chart of accounts is really analogous to taking the financial statements and assigning a number to each line—even the blank lines, titles, subtotals, totals, comments and headings. Does this sound simple? It really isn't all that complex, and doesn't take too long to do. However, it does impose some limitations upon the user. For example, it takes craft and ingenuity to combine several

general ledger accounts into one amount on the financial statements, and even more skill to call something on the financial statements by a different name from that used by the account in the general ledger.

The importance of these two tricky areas becomes evident upon reflection: suppose the company has three bank accounts and wants to show them as one figure "cash" on the financial statements? Under the standard set-up, there appears to be no way to accomplish this, since there is a line in the financial statements for each account. Using sub-accounts, though, one can get around the problem. These same sub-accounts help a user to call a general ledger account by a descriptive name, such as Loan 48665, and still make the financial statements look nice by calling it "Loans Payable."

The "FGH" part of the account structure is assigned by the program, and is not available to the user. It is used to keep track of record numbers and other interesting features.

The use of this account-coding scheme gives some flexibility to the formatting of the financial statements—far more than a program such as Boss (distributed by Lifeboat Assoc., New York, NY), but far less than the editor system used by Palintir's general ledger system (distributed by Designer Software, Houston, TX). On the other hand, the system adopted imposes a number of restraints upon the user in the area of numbering of accounts—since the real account numbers are really only three digits long. As in most things, there are compromises, which make sense when balanced.

Another compromise that accountants have long accepted is the issue of year-to-date detail general ledgers. Most systems just don't have the capacity to store an entire year's data in the system. Accordingly, they adopt the "balance forward" approach, in which each month's detail general ledger has the beginning balance, the activity for that month only and the ending balance. The CPAids system allows a user to maintain a historical general ledger containing all of the activity for that entire year. It does so through a clever design that includes using two general ledger files. One file, which is kept on the regular disk, is just like the regular systems that have balance forwards. If the user opts, though, he may install a system that includes a separate disk devoted entirely to general ledger detail files. This disk can hold 5,000 transactions easily, and thus has the capability to keep an entire year's detail general ledger.

The regular general ledger files also include historical information—in the form of the balances for the last twelve months. This information is useful in the construction of financial statements and analysis.

The financial statements depend to some degree upon the ability of the user to follow directions and model his situation after the examples in the manual. With only minimal effort, however, the user should have no trouble creating very useful and pleasant-appearing financial statements. The user can create income statements for the month only, or a two-column income

***“Accounting,
if done correctly,
should be on
...a double-entry
basis.”***

the general ledger, without the necessity of creating a listing of the journal entries that it is making. This can result in tremendous headaches in the case of errors, or in a situation in which hardware problems affect files. The best interface is one in which an intermediate transfer file is created to summarize the activity from the other packages. This file should be listable, and editable before being posted to the general ledger.

Accounting, if it is done correctly, should be on what is known as a double-entry basis. That means for every dollar of debit, there is a corresponding and equal dollar amount of credits entered into the system. All of the packages we surveyed employed double-entry accounting, but some were more double than others. For example, in the Glector and the Data Index packages, the user makes one-sided entries—the computer figures the corresponding “other side.” This is usually done by specifying an entry type. For example, in the case of cash disbursements, the user will enter all of the check amounts and their distribution; the program will make the corresponding credit to cash. These systems work after a fashion, and perhaps are advan-

Offering CPAid...

statement (four if you count the percentage calculations), which has the current month and year-to-date or any other period-to-date shown. (In other words, the user could prepare a statement that contained the quarter-to-date, or the last six months-to-date, etc.)

The balance sheet options include a regular balance sheet containing only one set of figures, and a comparative balance sheet that can contain the year-to-date and any other period, including the last year's figures.

Transaction entry is of fundamental importance to a general ledger system. The CPAids system has a rather interesting approach to it. The files used to store transactions are sequential in their structure, which means that if the user has made entries previously that have not yet been posted, he gets to watch them all again as the system opens the file, reads all the previous data, and finally reaches the end of file. It's a quirk of Basic sequential files that the system must look at all the files starting from the beginning in order to find the end. Such a process can take several minutes if a number of entries have already been made, and just a few are yet to be entered. It is, however, one of the design consequences of using sequential files.

The journal-entry procedure allows the user to specify a journal type, a 15-character description, a six-character reference number and a date. When an account number is entered, the system looks it up and displays the account name. The system makes entries in batches of 15 lines per screen. There is no necessity to limit a journal entry to 15 lines, though, because the system will allow one to enter a screen full of data, even if it is out of balance. However, it will give a warning indication that the entry is out of balance. The entry sequence includes such helpful features as the ability to duplicate fields, to increment items (such as the check numbers) and to edit the entry at any time prior to writing it to the

file. The program uses about 41 bytes for each transaction line. Referring to our previous discussion about year-to-date history disks, it's not too hard to calculate how many transactions a 300K disk would hold—about 7,000 total.

There is one aspect to the transaction-entry sequence that will be unusual to the non-accountant. Anyone familiar with accountant's adding machines usually knows that the accountant doesn't enter decimal points when adding figures—the machine puts them in automatically. For example, when an accountant puts 20000 into his calculator, the machine interprets it as 200.00. The CPAids program works the same way. Decimal points are not entered. Instead of using DR and CR, the CPAids program uses positive numbers as debits and negative numbers as credits. This takes some getting used to, particularly since accountants are used to thinking in terms of the number first, then it's disposition as a debit or a credit.

The system includes a complete fixed-asset accounting module. It is not integrated into the general ledger, however, so it will not make entries directly to the those files. However, it does just about anything else needed. It has the capability to maintain up to three separate forms or classes for each client. Within each class, there may be up to 1,000 assets for each schedule. The system will calculate depreciation using the straight line method, the sum-of-the-years digits method, the declining balance method, or the ACRS (Accelerated cost recovery system) for assets purchased after 1980. The system has an automatic change from accelerated-to-straightline in order to achieve maximum depreciation in the current year. It also has safeguards to insure that an asset is not depreciated below its cost or salvage value. There is the capability to override the automatic calculations, also. One of the nice features of the system includes the ability to have it calculate and summarize the current year's investment tax credit.

tageous for those with no accounting training. However, their flexibility is necessarily limited, especially when complex adjusting entries are required. Most accountants would agree that if the user doesn't possess the sophistication to understand both sides of an accounting entry, he shouldn't keep his own ledger.

The manner in which an accounting system handles the chart of accounts gives a good clue as to the whole architecture of the system. There seem to be two categories of general ledger programs. In one, the choice of the chart of accounts is entirely up to the user, within the limitations of the system. These programs have little link between the chart of account numbers and the structure of the financial statements. Usually, a report writer is used to generate whatever financial statements are required, and they allow the user to put together his financial statements in whatever format he desires. While gaining a lot of flexibility, such systems lack simplicity. Setting up financial statements can be a tedious and time-consuming task. The results, however, often more than justify the effort. Special analyses and fancy schedules are no problem for those programs.

The other approach towards the chart of accounts (and by far the most common method) is an adaptation of a scheme used for years on mainframe computers. The programs limit the user in the freedom of choice in the use of account numbers, because the account numbers are used as an integral element in the layout of the financial statements. A classic example of this is the CPAids chart of accounts structure (reviewed in the accompanying article). The Structured Systems Group general ledger is another good example: the coding of the chart of accounts sets up the general ledger, but it simultaneously formats the financial statements. Such a scheme is generally much easier to use, but does bind the user to some conventions.

The extension of this approach is one in which the chart of accounts is set, with very little modification possible. The Boss system employs this approach. While at first glance such a system seems arbitrary and almost like a straitjacket, the simplicity of it is sublime. What's more, what the user lacks in account choice flexibility, he gains many times over in report capabilities. In the Boss system, for example, there are literally

The system keeps track of assets by asset numbers. Additionally, there can be up to 10 forms, so that with a little ingenuity, the system can be used to indicate asset location or department location. Further, the system includes the capability to calculate depreciation on tax basis as opposed to historical cost—a minor point that can be of major significance in certain tax situations.

As an additional program, the package includes a short program that produces an amortization schedule for loans and other interest-bearing obligations. The system is somewhat unsophisticated, since it does not account for any balloon payments, nor does it differentiate between stated interest and APR interest. However, in simple applications, it could prove useful. As in the case of the depreciation programs, there is no interface to the general ledger program.

The package includes a number of interesting utilities programs, including an editor and a program for generating the statement of changes in financial position.

The editor allows the user to change client names, alter accounts, change year-ends, and even change account amounts. Its use is obviously to be done with care, since it leaves no trail. The editor can also be used to look at the contents of a data file, or may even be used to delete an account, change journal data (including amounts, account numbers, dates, etc.). While there are sometimes needs for such procedures, the presence of such powerful programs without the structure of a backup and a procedural framework (such as a regular accounting entry) could lead to trouble if used indiscriminately.

The Statement of Changes in Working Capital program is designed to step the user through the preparation of the statement. It basically consists of an analysis of the current assets and current liability accounts, during which the user determines the nature of the changes in the components of working capital. Then there is a walk-through analysis of all changes in non-working

capital accounts. Each account is displayed with changes shown. The user explains the changes in the account (up to 40 characters per line item) and classifies the item as to where it will appear on the statement of changes. From a technical standpoint, the program appears sound, and quite usable. From the pragmatic standpoint, the program will not save too much work over the manual method of preparation.

The payroll system is designed to interface with the general ledger program, and additionally to be a stand-alone system, capable of calculating payroll and printing checks. Most accountants only need a payroll "after the fact" system, which is used as an extension of the general ledger system to record the client's payroll transactions and accumulate data for each employee to be used in the preparation of quarterly payroll tax reports, and the year-end payroll reports, which include W-2 forms.

The program includes the option of calculating deductions from built-in tables. The system will handle hourly or salaried employees, and has provisions for regular and overtime earnings, as well as Tip income. There are provisions for the standard federal income tax withholding, state withholding, social security and up to three municipal taxes (which could be used for Union dues, insurance, etc.) The system also has a column for non-taxable income, and advanced EIC payments. Overtime is paid at a flat 1.5 times straight time rate.

Since the income tax tables change quite often, the programs include complete instructions on how to modify the tables.

The package represents a workable client accounting program that has been used by hundreds of accountants very successfully. It does not represent state-of-the-art software with a lot of fancy bells and whistles. On the other hand, the programs work effectively, and should serve both businessmen and accountants well. □

—CH

dozens of reports that would be impossible to prepare under any other system, or would take literally weeks of programming. But the trade-off has its cost.

Our survey included a few admittedly trick questions. We wanted to determine whether the available software measured up in the areas of program and accounting controls. One of the questions was whether or not "one-sided entries" were allowed. Theoretically, in a good general ledger system, only two-sided entries should be allowed. Much to our amazement, almost half of the respondents stated that their software allowed users to make an entry without the corresponding offset. In other words, their software had no controls to prevent the ledger from going out of balance. Another trick question asked whether entries could be made to accounts that hadn't been set up yet. We wanted to find out whether a system would allow a user to make an entry that ended up "hanging in space." Again to our surprise, there were a few systems that allowed this to happen. In most of them, though, an error report was generated, which gave the user a starting point to solve the problem.

A third area in which we attempted to find problems was in the maintenance of accounts. Some programs allow the user to go into the general ledger detail and edit it directly. While changing names of accounts is acceptable, should a user have the capability of editing the general ledger detail (possibly changing descriptions, numbers, totals, etc.)? Such power generally gets a user in trouble. Conservative design would dictate that only journal entries can be made to change the contents of a general ledger account.

The capacity of a general ledger program is an area of great concern to most users. Our survey attempted to assess this by probing in several areas. The size of the account numbers was one indication. However, it really doesn't tell too much unless the user understands how many accounts the account-coding structure translates into. We asked the question directly, but again, the results are confusing unless a specific hardware configuration is given. Most of the software vendors have different versions for different machines, and the capacity of the system often depends directly upon the size of the disks used. Most of the numbers supplied, though, tended to indicate that for all but the most demanding applications, all of the software has enough capability to handle the average small business (assuming that the hardware was of sufficient disk capability). Another perspective on the issue of capability was addressed in our question on the largest dollar capability. The responses indicated that even the smallest system had the capability for totals in the millions.

Survey finds two ledger systems

There are two generic classifications of general ledger systems that seemed to emerge as a result of our survey. First are those systems that are akin to "balance forward" systems. They carry forward only the ending balance in each account from one month to the next. The historical detail is lost each month when the accounts are closed. This seemed to be the most popular method. (Considering the storage capability of most floppy disks, it is understandable.) The other approach is to leave as much detail as possible, and purge the older detail as the system gets full. This method requires the program to have some degree of

sophistication in handling dates. A third alternative is a hybrid method using two diskettes—an ancillary diskette is dedicated to contain a historical general ledger file. While switching diskettes may be somewhat inconvenient, this scheme seems to solve the problem.

One problem in attempting to compare reporting capabilities of different general ledger systems is that no two systems have exactly the same reports, and in many cases, a user really has to see exactly what they look like in order to determine whether they are appropriate or pleasing to the eye. However, we did determine a few interesting characteristics.

Rounding-off function was queried

Our first question ascertained whether the system could produce reports with cents rounded off. This feature is nice, because it often makes the reports easier to read. Only a few systems allowed for it. The next inquiry was whether dollar signs were shown on the totals. Again, mostly a cosmetic item, but indicative of the system's sophistication. The questionnaire also attempted to determine whether double underlining was done on totals, and whether the account numbers were printed on the statements. The presence of account numbers on the statements was a tip-off to us of a relatively unsophisticated program.

We also wanted to find out whether a program would produce the "Statement of Changes in Financial Position" or so-called funds flow statement. Most of the programs had some provisions for producing it, although among the few that we investigated in depth, they weren't automated entirely, requiring input from the operator at the time of preparation.

Many of the programs that used the chart of accounts to format the financials allowed the user some latitude in the descriptions used by setting up "dummy accounts" that contained descriptions, and instructions on sub-totalling, etc. The degree of flexibility was hard to assess in the absence of the program, but a potential user should investigate it in depth before purchase. Of particular concern should be the ability to account for branches (either separately or in combination). Also important is the ability to combine accounts on the financial statements (for example, to consolidate three bank accounts into one figure for cash on the financial statements, or three sales accounts into one consolidated sales account). Many of the systems appeared to have some flexibility, but the user should lay out his specific requirements and discuss these with his accountant before committing to a particular program.

Almost all of the programs had some form of percentage calculations on the income statement. Unusual, though, were the features of the Boss System, which calculated financial ratios such as current assets, inventory turnover, and return on investment in addition.

The information in the accompanying charts was compiled from information submitted by software vendors. While every attempt has been made to insure accuracy, there may be differences in interpretation of questions, and certain software may have other features not listed here.

The following numbered notes correspond to the chart column headings:

- 1) Language - Indicates which language the system has been written in. The abbreviations are:

B - Basic, MB Microsoft Basic, CB - CBasic,
FOR - Fortran, ASM - Assembly language, C
-Cobol, NB - NorthStar Basic

- 2) Source Code - Indicates whether **Supplied**, **Available**, or **Not available**.
- 3) Support Hotline - indicates whether a support hotline exists. Generally not a toll-free WATs number.
- 4) Series - indicates whether other programs are part of a series or related package. See #6
- 5) Integrated - Indicates whether the other programs are integrated into this package. (whether they communicate via file transfers, etc.)
- 6) Other programs in series - include -
 - Big 5 - inventory, accounts receivable, accounts payable, payroll and general ledger
 - O/E - order entry
 - P/R - payroll
 - C - cost accounting
 - P/O - purchase order accounting
- 7) Checklist - does the documentation include checklists to help the user implement the program?
- 8) CRT Screens - does the manual have samples of the CRT screens used by the program?
- 9) Flow Charts - are they included?
- 10) Blank Entry Forms - does the documentation include a series of "templates" or blank forms to help the user organize his data for use on the system?
- 11) Index - does the manual have a good index or table of contents?
- 12) Sample Reports - are they included in the manual?
- 13) Is the system a double entry system?
- 14) The number of digits in an account number. This includes sub accounts and (where provided) shows how many major/subaccount codes are possible (i.e. 4 + 2 is four-digit account code plus a two-digit sub account code - XXXX.XX.)
- 15) Can the user specify the account number ranges? Or are they set by the system? In other words, does the user have latitude in establishing his own chart of accounts on the system?
- 16) Can a user uncloze a month to add more detail (journal entries)?
- 17) Are sub accounts available on the system?
- 18) Can recurring journals, such as the depreciation entries, be made automatically on a month-to-month basis?
- 19) Is a journal entry "type" shown? (Such as CD for cash disbursements, CR for Cash Receipts, etc.)
- 20) The number of accounts (maximum) that the system can accommodate. "Disk" means that the capacity of the system depends upon the disk capacity of the user's hardware.
- 21) The number of transactions (entries) maximum that the system can accommodate in any one accounting period (month). "Disk" means that the capacity depends upon the user's hardware.
- 22) The dollar capacity in digits that the system will accept. (For example, 8 digits equals 999,999.99.)

- 23) Does the system allow the user to make "one-sided entries," or entries for which the debits do not equal the credits?
- 24) Does the system allow users to make entries to accounts that have not been set up on the system?
- 25) Does the software require a batch listing of journals before posting to the general ledger?
- 26) Can the user access the data files directly to edit dollar amount data (without making a journal entry)? "Yes" indicates an accounting weakness (possible lack of audit trail).
- 27) Does the system allow a historical ledger by storing multiple months data?
- 28) How many description spaces are available for the journal entry information and the GL?
- 29) Can the user display contents of a general ledger account on the CRT (terminal)?
- 30) Are historical figures kept on the general ledger (generally one month end-total for each account for each month)?
- 31) Is budget data kept on the general ledger (generally one budget figure for each month for each account)?
- 32) Is a trial balance prepared? A trial balance is a listing that has each account, the beginning balance, changes for the month and ending balance.
- 33) Does the program allow the user to specify the rounding off of cents? (Are dollar amounts only shown on the financials?)
- 34) Does the system show dollar signs besides totals?
- 35) How many columns are shown in the income statement?
- 36) Is the Statement of Changes in Financial Position (funds flow statement) prepared?
- 37) Can the user specify what the titles on his financial statements are to be?
- 38) Can the user combine several general ledger account balances to one figure on the financial statements?
- 39) Are percentages calculated and shown on the income statement?
- 40) Is an editor used to construct the financial statement layouts?

Undoubtedly, there are several fine general ledger packages that aren't included in our comparison charts. In some cases, the vendor didn't respond to our inquiries, and an appropriate spokesperson couldn't be reached during our follow-up calls. Or we may simply have missed a few companies in our initial research. We'd like to hear about any good packages that our readers are aware of that might be included in future editions of the survey.

The results of the survey indicate a growing sophistication in the quality of business software available. While there are a number of similarities between most of the packages, the average user has a good variety of choices to find the best package to suit his particular needs. □

Charts follow

GL Feature Comparison

Company	Price	For What Hardware	Language	Source Code	Support Hotline	Part of Series (Y/N)	Is It Integrated?	Other Programs in Series	Manual Documentation					# Digits in Account #	User Specify Acct. # Range?		
									Checklist	CRT Screens	Flowchart	Blank Entry Forms	Index			Sample Reports	Double Entry?
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Business Applications Software	\$ 390	CBasic II, CP/M	B	S	Y	Y	Y	A/R, A/P	N	N	N	Y	N	Y	Y	4+4	Y
Charles Mann	\$ 550	Apple	—	S	Y	Y	N	Construction, Job Cost	Y	Y	Y	N	N	Y	Y	4	N
Complete Business Services	\$ 300	North Star H/O	B	S	Y	Y	Y	Big 5, O/E	Y	Y	Y	N	N	Y	Y	4+2	Y
Compumax	\$ 350	CP/M 8-in./STD 5¼-in. Micropolis, Apple	MB	S	Y	Y	Y	Big 5, C	Y	Y	N	N	Y	Y	N	4	N
CPAids	\$ 450	CP/M	MB	A	Y	N	N	P/R, Tax, Property	Y	Y	Y	N	Y	Y	Y	5+3	N
Dakin5 Corporation	\$ 625	Apple II, II+	ASM, Applesoft	N	Y	Y	Y	A/R, A/P	Y	Y	N	Y	Y	Y	Y	5	Y
DASI	\$ 750	CP/M, TRSDOS 64K Necessary	MB	S	Y	Y	Y	Big 5, C	Y	Y	N	N	N	Y	Y	4+2	Y
Data Index	\$5,600	IBM I	EDL	A	Y	Y	Y	Big 5	N	Y	Y	N	Y	N	Y	4+6	Y
Designer Software	\$ 850	CP/M	Compiled, C, ASM	N	Y	Y	N	A/P, A/R, Property	Y	Y	N	Y	Y	Y	Y	6	Y
Digital Technology	\$ 599	Ohio Scientific	MB	S	Y	Y	Y	Big 5, O/E, P/R	Y	Y	N	N	N	Y	Y	5	Y
Dynamic Microprocessor	\$ 595	CP/M	FOR	N	Y	N	Y	Data Base, A/R, A/P	Y	Y	Y	Y	Y	Y	Y	7	Y
Lifeboat Associates	\$2,450	CP/M, 2 disks, 48K TPA	MBC	N	Y	Y	Y	Includes A/R, A/P	Y	Y	N	Y	Y	Y	N	3	N
MicroAp, Incorporated	\$ 350	Req Selector CP/M	CB	N	Y	Y	Y	Data Base	Y	Y	N	N	Y	Y	N	5	N
Microed	\$ 450	CP/M	FOR	N	N	Y	N	Big 5	N	Y	N	Y	Y	Y	Y	28	Y
Micro Mike's	\$ 750	North Star, CP/M+	B	A	Y	Y	N	Big 5	Y	Y	N	Y	Y	Y	Y	4	N
Modern Microcomputers	\$1,000	CP/M	CB, MB	A	Y	Y	Y	A/R, A/P	Y	Y	N	N	N	Y	N	3	N
National Software Marketing	\$ 600	TRS-80 model II	B	S	Y	Y	—	includes O/E, A/R, A/P	N	Y	Y	N	N	Y	Y	6	Y
Occupational Computers	\$ 495	TRS model I, II, III, CP/M	MB	S	Y	Y	Y	Big 5	Y	Y	N	Y	Y	Y	Y	4+4	Y
Omni Software	\$ 150 \$ 150	North Star NS DOS	B B	S S	Y Y	Y Y	Y Y	Big 5 (no inv) Osborne	Y Y	N Y	N Y	N Y	Y Y	N Y	Y N	3+2 4+2	Y N
Peachtree	\$300-\$600	CP/M+, Apple II, TRS-80	MB	S	Y	Y	Y	Big 5, O/E	N	Y	Y	Y	N	Y	Y	6	Y
Personalized Computers	\$2,000	OASIS	B	S	N	Y	N	Big 5	N	N	N	N	Y	Y	Y	6	Y
Quicktax, Ltd.	\$500-\$2,500	CP/M, MDOS	B	N	Y	Y	N	includes Tax, A/R, Mail List	Y	Y	N	Y	N	Y	N	6	N
Radio Shack	\$ 100 \$ 199 \$ 499	Model III, I Model II Model II	B B C	S S A	Y Y Y	Y Y Y	N Y Y	Big 5 Big 5 Big 5	Y Y Y	Y Y Y	Y Y Y	Y Y Y	N Y Y	Y Y Y	Y Y Y	4 4 4+3	N N Y
Relational Systems	\$ 495	CP/M	CB	S	Y	Y	Y	Big 5	Y	Y	N	Y	Y	Y	Y	4+2	N
Serendipity Systems	\$ 169	Apple II+	B	N	Y	Y	N	Inv., Stat	N	Y	N	Y	Y	Y	Y	3+1	—
Software Technology	\$275-\$450	Apple	ASM	N	N	Y	Y	Big 5, Data Base	Y	Y	N	Y	Y	Y	Y	5	Y
STR Corporation	\$195-\$675	OASIS	B	N	Y	Y	Y	Big 5, O/E, P/O	N	Y	N	Y	Y	Y	Y	9	Y
Structured Systems	\$1,250	CP/M	CB	A	Y	Y	Y	Big 5, O/E	Y	Y	Y	Y	Y	Y	Y	6	N
Systems Plus	\$2,500 —	CP/M CP/M 350K MP/M minimum	CB CB	N N	Y Y	Y Y	Y Y	Big 5 Included A/R, P, O/E, P/R	N Y	Y Y	N Y	N Y	Y Y	Y Y	Y Y	6 8	Y Y
TCS Software	\$1,795	CP/M, 57K	MB	A	N	N	N	—	Y	N	N	N	Y	Y	Y	6	Y
Technico	\$2,000	TI-32, CP/M+, Proprietary	B	A	Y	Y	N	Big 5	N	Y	Y	Y	Y	Y	Y	4+3	Y
Technology Systems	\$ 500	North Star or CP/M 2.2 + NS Basic	NB	S	Y	Y	Y	Big 5, O/E	Y	Y	Y	Y	Y	N	Y	6+2	Y
TLB Associates	\$3,495	CP/M	PL/I	A	N	Y	Y	includes Big 5	Y	Y	N	Y	Y	Y	Y	4	Y
Univair, International	\$ 500	CP/M, 48K 256K or H/O	C, B	N	N	Y	Y	Big 5	Y	Y	N	N	Y	Y	Y	4	N
Vandata	\$ 295	CP/M, CBasic II	CB II	S	N	Y	Y	A/R, A/P, Payroll	Y	Y	Y	N	Y	Y	N	5+1	Y

GL Feature Comparison (continued)

Company																	Reports									
	Unclose Month?	Sub-Accounts	Auto-Recurring JE	JE Type Shown	# of Accounts	# of Transactions	\$ Capacity (Digits)		One-Sided Entries?	Undefined Accounts	Batch Listing Prepared	User Modify Data	Store Multiple Mo. Data	Description Spaces	Account Inquiry @ CRT	Historical Figures	Budget Figures	Trial Balance	Optional Cents Round-Off	\$ On Totals	Columns in Reports	Stmnt. of Acct. Prepared	Specify Titles	Combine Accounts	Percentages	Editor Used
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40		
Business Applications Software	Y	Y	N	Y	Disk	Disk	10	N	N	Y	Y	Y	10	Y	Y	Y	Y	N	N	8	N	Y	Y	Y	Y	
Charles Mann	Y	Y	Y	Y	—	6,000	14	Y	N	Y	Y	N	35	Y	N	Y	Y	N	Y	—	Y	Y	N	Y	Y	
Complete Business Services	N	Y	N	Y	Disk	Disk	10	Y	N	Y	N	Y	25	Y	Option	N	Y	N	N	4	N	Y	N	Y	N	
Compumax	N	Y	Y	Y	350	1,000	11	Y	N	N	N	N	30	Y	N	N	Y	N	N	3	N	N	N	Y	N	
CPAids	Y	Y	N	Y	400	1,000	9	Y	N	Y	Y	Y	15	Y	Y	N	Y	N	Y	4	Y	Y	—	Y	N	
Dakin5 Corporation	N	N	Y	Y	250	1,000	10	N	N	Y	N	N	—	N	Y	N	Y	Y	Y	2	N	N	Y	N	N	
DASI	N	Y	N	Y	2,000	8,500	10	N	N	Y	N	Y	20	Y	Y	Y	Y	N	N	4	N	Y	Y	Y	N	
Data Index	Y	Y	Y	Y	10,000	Disk	12	N	N	Y	N	Y	24	—	Y	Y	Y	N	Y	4	Y	Y	Y	N	N	
Designer Software	Y	Y	N	Y	47,234	Disk	—	Y	N	Y	N	Y	30	Y	Y	Y	Y	Y	Y	—	Y	Y	Y	Y	Y	
Digital Technology	Y	Y	N	Y	800	999	9	N	N	N	N	N	25	Y	Y	N	Y	N	N	4	N	N	N	Y	N	
Dynamic Microprocessor	Y	Y	Y	Y	Disk	Disk	—	N	N	Y	Y	Y	10	Y	Y	N	Y	N	Y	—	N	Y	Y	Y	Y	
Lifeboat Associates	Y	Y	Y	Y	900	9,000	10	N	Y	Y	Y	N	25	Y	Y	N	Y	Y	Y	12	Y	N	Y	Y	N	
MicroAp, Incorporated	Y	N	Y	Y	220	2,000	10	N	N	Y	Y	Y	25	Y	Y	N	N	N	N	6	Y	N	N	Y	Y	
Microed	N	Y	N	Y	Disk	Disk	8	N	N	Y	Y	Y	40	N	Y	N	Y	N	Y	—	N	Y	N	Y	Y	
Micro Mike's	Y	N	N	Y	500	Disk	10	N	N	N	Y	N	25	Y	N	N	Y	N	N	4	N	N	Y	Y	N	
Modern Microcomputers	Y	Y	N	N	600	Disk	10	Y	N	Y	Y	N	20	Y	Y	Y	Y	N	Y	—	—	N	N	N	—	
National Software Marketing	N	Y	N	Y	256	1,100	11	Y	N	Y	N	N	20	Y	Y	Y	Y	N	N	3	N	Y	—	Y	N	
Occupational Computers	Y	Y	Y	Y	2,000	12,000	13	N	N	N	Y	30	Y		Y	Y	Y	N	Y	3	Y	Y	Y	Y	N	
Omni Software	N	Y	N	N	250	1,000	9	N	N	Y	N	N	22	Y	N	N	Y	N	Y	4	N	Y	Y	Y	N	
	N	Y	N	Y	250	1,000	10	N	N	Y	N	N	25	Y	N	Y	Y	N	N	4	N	Y	Y	Y	N	
Peachtree	N	Y	Y	Y	Disk	Disk	9	N	N	Y	N	N	25	Y	Y	Y	N	N	N	7	N	N	N	Y	N	
Personalized Computers	Y	Y	Y	Y	Disk	Disk	12	N	N	N	N	Y	20	Y	Y	Y	Y	Y	Y	132	Y	Y	N	Y	Y	
Quicktax, Ltd.	Y	Y	N	Y	400+	1,000+	10	Y	N	Y	Y	Y	25	N	Y	Y	Y	Y	Y	—	Y	Y	Y	Y	N	
Radio Shack	N	N	N	N	100	1,830	10	N	N	N	N	N	20	Y	N	N	Y	N	N	4	N	N	N	Y	N	
	N	N	N	Y	504	11,420	12	N	N	N	N	N	20	Y	N	N	Y	N	N	4	N	N	N	Y	N	
	Y	Y	N	Y	400	4,300	12	N	N	N	N	Y	30	Y	Y	Y	Y	N	Y	8	Y	Y	Y	Y	Y	
Relational Systems	Y	Y	Y	N	Disk	Disk	9	Y	N	N	N	Y	—	Y	Y	Y	Y	—	Y	—	Y	N	Y	Y	N	
Serendipity Systems	—	—	—	—	800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Software Technology	Y	Y	Y	Y	500	600	8	Y	Y	Y	N	Y	22	Y	Y	Y	Y	Y	Y	12	Y	Y	Y	Y	N	
STR Corporation	Y	Y	Y	Y	2,000	2,000	11	N	N	Y	Y	Y	25	Y	Y	Y	Y	N	Y	3	Y	Y	Y	Y	N	
Structured Systems	Y	Y	N	Y	6,000	Disk	13	N	N	Y	Y	N	25	N	N	N	Y	Y	Y	3	Y	Y	Y	Y	N	
Systems Plus	N	Y	Y	N	10,000	Disk	12	N	N	N	N	Y	25	Y	N	N	N	N	N	4	N	N	N	Y	N	
	Y	Y	Y	Y	65,000	65,000	—	N	N	Y	N	Y	30	Y	Y	Y	Y	Y	Y	—	N	Y	Y	Y	N	
TCS Software	Y	Y	Y	Y	Disk	32,000	10	N	N	N	N	Y	25	Y	Y	Y	Y	Y	N	—	Y	Y	Y	Y	N	
Technico	N	Y	Y	Y	9,000	Disk	14	N	Y	Y	N	N	15	—	Y	Y	Y	Y	Y	5	Y	Y	Y	Y	N	
Technology Systems	Y	Y	N	Y	1,000	2,000	8	Y	Y	Y	Y	Y	25	Y	Y	Y	Y	Y	N	4	N	Y	Y	Y	N	
TLB Associates	—	Y	N	N	9,999	Disk	12	N	N	N	Y	N	15	Y	Y	Y	Y	N	N	—	N	Y	Y	N	N	
Univair, International	N	N	N	N	Disk	Disk	10	N	N	Y	N	N	20	Y	Y	N	Y	N	Y	4	N	Y	N	Y	N	
Vandata	Y	Y	N	—	Disk	—	11	Y	N	—	Y	N	—	Y	Y	N	N	N	Y	4	N	Y	N	Y	N	

GL Feature Comparison (continued)

Company	Address	Comments
Business Applications Software	16755 Littlefield Lane, Los Gatos, CA 95030	Monthly and quarterly P and L, consolidations, job/protect costing, auto backup
Charles Mann	55722 Santa Fe Trail, Yucca Valley, CA 92284	Custom form generator
Complete Business Services	90 W. Center St., Logan, UT 84321	Can print one, all or combination of accounts in G/L, edit transaction @ any point
Compumax Associates	P.O. Box 7239, Menlo Park, CA 94025	Optional cents round-off available, "NOMDA" chart of accounts (preset chart) can set up some special accounts
CPAids	1640 Franklin Ave., Kent, OH 44240	Basically client write-up package
Dakin5 Corporation	7475 Dakin St., Denver, CO 80221	
DASI	2145 NW 10th, Gainesville, FL 32601	Posted from sub-system, auto posting on-line, 99 divisional capability, full direct access (no sequential)
Data Index	4390 Alpha, Dallas, TX 75234	Does not print checks, invoices. Can record several different currencies, has quantity field (cost per unit), multicompartment, consolidations
Designer Software	3400 Montrose Blvd. #718, Houston, TX 77006	Set up accounts during entry, flexible report writer
Digital Technology	Box 178590, San Diego, CA 92117	Has CPA package add-on with much more including, tax package, multiple books
Dynamic Microprocessor	545 Fifth Ave., New York, NY 10017	Budget can be installed by user, system is basically a data base and applications
Lifeboat Associates	1650 Third Ave., New York, NY 10028	Edit while making JEs, 99 possible reports, preset chart of accounts, makes ratio analysis, automatic account setup, easy setup
MicroAp, Incorporated	7033 Village Parkway #206, Dublin, CA 94586	Using data base can write any reports necessary, selector data base required
Microed	3910 Bandini St., San Diego, CA 92103	Software creates data base, unlimited report format
Micro Mike's	905 S. Buchanan, Amarillo, TX 79101	Hard disk capability, very easy to use. It does DR/CR automatically
Modern Microcomputers	63 Sudbury Lane, Westbury, NY 11590	CPA write-up package
National Software Marketing	4701 McKinley St., Hollywood, FL 33021	Software customized on request
Occupational Computers	22311 Ventura Blvd. #123, Woodland Hills, CA 91364	Budget module and client write up, 99 different journals, cumulative G/L (yearly ledger)
Omni Software	146 N. Broad St., Griffith, IN 46319	Osborne system, receivables and payables also
Peachtree	3 Corp. Sq. #700, Atlanta, GA 30329	
Personalized Computers	501 S. First, Arcadia, CA 91006	Unlimited report capabilities including footnotes, cover letters, etc.
Quicktax, Ltd.	319 Clawson, Staten Island, NY 10306	Prepares compilation report, unlimited postings in period
Radio Shack	700 One Tandy Center, Fort Worth, TX 96102	Easy to put up Easy to put up, well defined, complete audit trails 7 diskettes (3 diskettes of sample data) complete financial report systems
Relational Systems	5002 Commercial St. SE, Salem, OR 97306	Flexible reports, department incl. statements, multiple clients, comparisons, supporting schedules
Serendipity Systems	419 W. Seneca St., Ithaca, NY 14850	
Software Technology	Box 428, Belmont, MA 02178	300 dealers
STR Corporation	25A Technology Park, Norcross, GA 30092	Can close multidivisions independently, departmental
Structured Systems	5204 Claremont, Oakland, CA 94618	
Systems Plus	1120 San Antonio Rd., Palo Alto, CA 94303	Integrated package Files can be rebuilt in the field, password protection, end users training manual
TCS Software	3209 Fondren Rd., Houston, TX 77063	Complimentary software in development - summer 1982
Technico	9051 Red Branch Rd., Columbia, MD 21045	Dual 16-bit microprocessor, multiple companies, autoloader does ratio analysis automatically
Technology Systems	208 Greenwood Ave., Bethel, CT 06081	Comes with preset security code to modify data directly, fast sorting using assembly
TLB Associates	P.O. Box 414, Findlay, OH 45840	Included fixed assets, mail list, P/O, inventory, invoicing
Univair, International	10327 Lambert Int'l Airport, St. Louis, MO 63145	Multiple company I.D. codes, has forecast report
Vandata	17544 Midvale Ave. N., Seattle, WA 98133	Can be resold without royalties to Vandata, integrated package

COMPUTER HOW-TO BOOKS FROM



**DATA
DYNAMICS
TECHNOLOGY**



Z-80 Microcomputer Handbook *William Barden, Jr.*

The Zilog Model Z-80 represents a microprocessor that is extremely sophisticated and attractive to many computer users. This handbook will provide the current and prospective user with essential information on the technology of the Z-80. Organized into three sections, the first section concentrates on hardware, the second on software, and the third on microcomputers built around the Z-80.

Order No. 0-672-21500 304 pages \$11.95

Computer Graphics Primer *Mitchell Waite*

Describes one of the most exciting developments in the new home computer products—computer graphics. Computer graphics is the ability to create complex drawings, plans, maps, and schematics on the screen of a television set.

Order No. 0-672-21650-7 184 pages \$14.95

BASIC Programming Primer *Mitchell Waite and Michael Pardee*

This book will serve as an invaluable tool to anyone who wants to learn BASIC, the most popular computer language today. Seven chapters explain the fundamentals of BASIC, program control, organization and a game program, additional functions, and variations of BASIC.

Order No. 0-672-21586-1 240 pages \$11.95

Howard Sams Crash Course in Microcomputers *Louis E. Frenzel, Jr.*

Because of its content and unique form of presentation, the reader is provided with a solid background in microcomputers quickly and effectively. This course, arranged as a series of lessons in a self-teaching format, features 14 units and 2 appendices that will teach the average consumer as effectively as the scientist with a PhD to deal with complete microcomputer systems.

Order No. 0-672-21634-5 264 pages \$19.95

PASCAL Primer

David Fox and Mitchell Waite

If you are a computerist who is eager to learn the capabilities of PASCAL, this book is written for you. PASCAL is a computer language with features and capabilities only found among the most high ranking languages. This book will describe PASCAL program structure, variables, procedures and many other features.

Order No. 0-672-21793-7 206 pages
\$16.95

Guidebook to Small Computers *William Barden, Jr.*

If you are contemplating buying a small computer system for your home, office, or business, this book can save you time and trouble. It contains all the information necessary for a prospective buyer to make an intelligent selection of a small system. The first chapter is a general introduction to small computers and presents the fundamentals of hardware and software. The remaining chapters feature a survey of 21 currently popular systems and are illustrated with photographs, drawings, and charts. A handy directory of small computer manufacturers concludes the book.

Order No. 0-672-21698-1 128 pages \$6.95

DATA DYNAMICS TECHNOLOGY P.O. Box 1217, Cerritos, CA 90701

Name (Print) _____
Address _____
City _____ State _____ Zip _____

Please send me:

Order #	Qty	Price	Total	Order #	Qty	Price	Total

Shipping & Handling Charges \$2.00 ea. U.S., \$5.00 ea. Foreign

TOTAL ORDER \$

*TAX \$

SHIPPING & HANDLING \$

TOTAL ENCLOSED \$



☐ Check or M.O. (U.S. Funds drawn on U.S. bank)

Exp. Date _____ Signature _____

*California residents add 6% sales tax. Availability and prices quoted subject to change without notice.
Please allow 6-8 weeks for delivery. You may photocopy this page if you wish to keep your INTERFACE AGE intact.
Orders cannot be shipped unless accompanied by payment, including shipping & handling and tax where applicable.

DATA DYNAMICS TECHNOLOGY, A Division of INTERFACE AGE Magazine (213) 926-9548

DATA BASE MANAGERS: Four for the Apple

by Voyle A. Glover

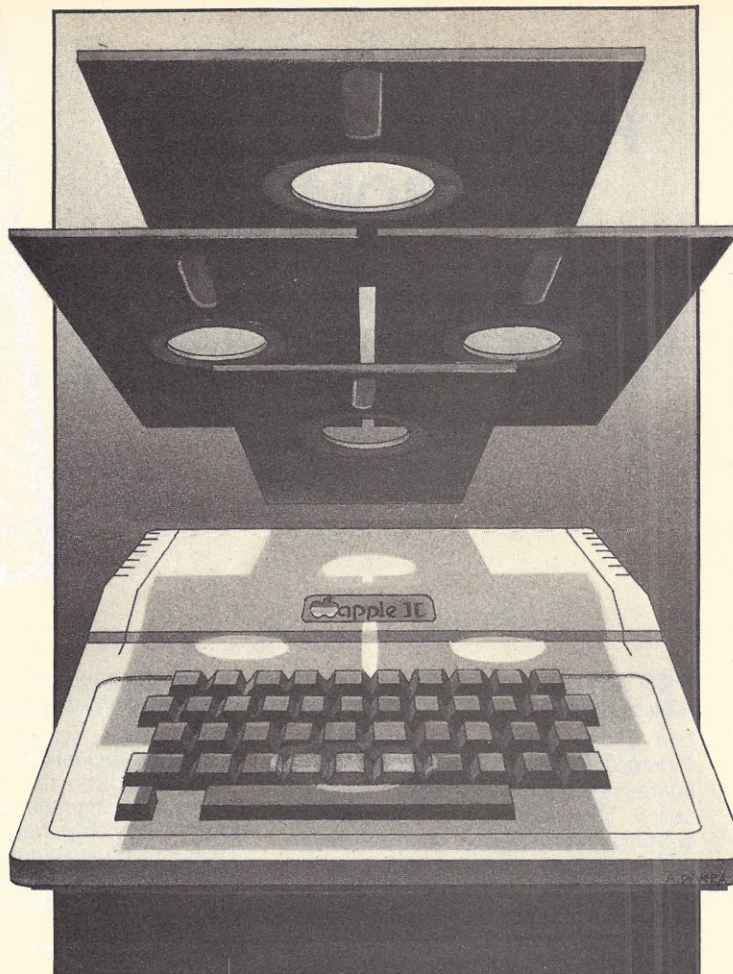
Four popular data base managers (Datadex by Information Unlimited Software, Berkeley, CA; Data Factory by Micro Lab, Highland Park, IL; DB Master by Stoneware Microcomputer Products, San Rafael, CA; and PFS by Software Publishing Corp., Palo Alto, CA) provide an interesting cross section of end-user applications. By examining the essential features of each, we can gain some understanding of the types of functions that a data base manager system can perform, and the consumer can decide which of these four best suits his particular needs.

All four programs run on a 48K Apple, under DOS 3.3, with at least one disk drive, although dual disk drives are suggested for maximum efficiency.

Datadex is the most expensive of the four. For many, needs will not justify the price, and for others, almost no price is too great if it does a particular job well.

The manual comes in a binder, with a master disk and a sample applications disk. You are told that if you send in the warranty card, you will get a back-up program disk. The manual is illustrated with sample "screens," showing what the user will see at a particular stage. This is very useful. Even more helpful is the sample applications disk. There are nine files ranging from a People file, to Elements, and even TV Special—a cartoon-like file. The manual is divided into 12 chapters.

A brochure is included, containing all the commands. It is only through use that one can use the program with any measure of ease, but the commands are not difficult to learn or apply. They are grouped under five headings, with commands working within more than one group. The headings are: Main Menu, Disk Find, Create Reports, Enter Data and Create Files. The commands are typically a Control (CTRL) plus a letter, such as



within Enter Data, CTRL A will move the cursor to the previous field of your record, or a CTRL X to go to the last record of an "extent" of a file. (Extents denote the amount of records main memory will hold. Thus, you might have 50 or more within a particular file.)

When you create a file, the program allows the user to grab a portion of the display created and move it around on the screen, until satisfied with the position. This is totally unique; I used it often.

You can print a copy of the screen and records can be printed in report fashion (where you have specified the form) or as they appear on the screen.

There are nine fields possible for a record. (A field is an allocated space for something in your record, such as nine spaces for a zip code.) They are: Text, Integer, Floating Point (up to nine digits), Date (MM/DD/19YY or MM/DD, or MM/DD/YYYY), Phone (with or without prefix), Clock (if you have one in your Apple), Social Security number and the nine-digit zip. When creating a file, you can place titles anywhere on the screen, vertically or horizontally. These are called Comments and you are allowed 21 of them. The more room you take up on the screen with comments, the less room you have for fields. This is important, and I would have liked to have seen a second page for more fields.

When you load up the program, you will see the main menu, giving you five displayed options and one option at the bottom line that is not clearly understood unless you've read the manual. This is the Utility choice; you will use it to do any creating. So a press of the numeral "1" presents another menu, giving you the choices of

creating files or reports, sorting or initializing a diskette, or reconfiguring for a clock board or a different printer.

Perhaps you need a blank diskette, so you choose to initialize. After the program is ready, you are told to insert the blank diskette. If the diskette is not blank, the program will stop and tell you it is not blank and ask you if you want to proceed. Once you have this done, you will want to create a file. After this is loaded (in a few seconds), you will then have a choice of either altering a previous file (in our case there are none), or creating a new file. Choosing to create a new file will give you a blank screen with the cursor in the center. If you are familiar with EasyWriter (from the same manufacturer), the commands for moving the cursor around will be familiar, for they are the same. CTRL W, for example, moves the cursor up.

Typing a comment

After you have the cursor where you want it, you may want to type a header (comment). This is shown in reverse video until you press Return. Whenever you want to place a field on the screen, you will enter the command for the particular kind of field you want (text, integer, phone, date, etc.), and if it is a text or numerical field, you will be asked how many spaces to allot, up to the maximum width of the screen. This will depend upon whether you placed a comment/title at the beginning of the field or over it. If it is at the beginning, you will be allowed only 36 spaces minus the spaces taken by the comment/title.

Once the form for your record is built and you have grabbed titles and fields and moved them about to your satisfaction, save it. You will give it a starting extent number and a name. Thereafter, when doing searches, sorts, report creations or just entering data, you will use that name and extent number. When an extent is full, or if you want to put information in another extent (say for February), you simply assign a number to the extent. The file name remains the same. For example, you could have a Birthday file with 12 extents—one for each month of year.

I found the program very easy to use, with perhaps an exception being the report creations. There were not enough clear examples here, and I found myself floundering too often.

The file creation portion is more than satisfactory. It is nice to design your own "data card"—and it is very easy. There are many kinds of files that can be created and adapted. Some that I made up included: Check File, a fill-in-the-blanks file that gave all information about a check, including account number, and totals and subtotals for different accounts; People, a name-address file; Writing Ideas (ideas for articles, stories and novels); and Family/Medical, containing all illnesses, treatment, costs, dates, doctors, symptoms of a family.

I feel very comfortable with this program. Although many features cannot be mentioned due to space limitations, it is a worthwhile product. Retail price is \$295.

Data Factory is one of the most powerful data base managers available for micros. It is a compact, well documented package with two diskettes. While the original program runs on DOS 3.2, this one runs on 3.3.

My biggest criticism with the program concerns documentation. The manual is straight text, with few examples, and no screen samples. But it is normally not difficult to follow the directions, and the program itself

assists you with questions. Some of the questions are so terse as to create more questions rather than leading the user, but you quickly learn what is meant by doing the wrong thing. The new manual is much improved from the old version.

The program is almost entirely menu driven. This is a desirable feature, offsetting any deficiencies in the manual. There are a few CTRL commands. If you want to do anything with your data, either sorting, entering or replacing it, you will select that function from a menu, and that module will be loaded into memory from the program disk.

To create a new file, you will start the program with the master in Drive #1. The program will ask whether you are using a two disk system, then will ask you to insert a data disk. If it is not a 3.3 disk, the program will tell you. A press of the I key will initialize the diskette. You will then be asked whether you want to initialize a new file. Here is one example of a question that raises questions. When you are a novice you understand the word "initialize" only in the context of creating a new disk and erasing everything else. The word "create" would have been more appropriate.

One of the handiest features is the Construct and Append section. It allows you to "change your mind" (a direct quote from the manual). You may add up to 10 new fields each time you run this module, or decrease the number of fields, change field lengths or positions and append records to the file by blocks (i.e., records 10-20, 30-50).

You may wish to know how much disk space you have left. There is a module for that, or you might want to know how many records a particular file will hold in main memory.

Searching is easy and menu driven. You can search fields in multiple levels (up to 20). In other words, you might want to find all salesmen with sales over \$20,000, working in District 1, under a particular account, selling a particular product, etc. The level of search is handy and allows the user to select exactly the records he needs, and no others.

As a member of a local labor union who purchased the original Data Factory, I entered over 3,500 names, addresses and other related data into a file and the experience allowed me to become quite familiar with the program. The new program has corrected most of the problems I encountered, and is much improved. While the new program is more powerful, my experience on the original made it easy to incorporate the changes.

Think carefully before designing

It pays to sit down and think carefully about exactly what you want in a file and design it to care for every need. When I started, for instance, I did not use a last name field. Thus, when I wanted to do a sort (several hundred names later), I was dismayed to see everyone in perfect alphabetical order—for the first names only.

When you start a new file, after it loads up the program will ask for a file name (28 characters max). Then you will be asked how many fields—up to 88. Each field may contain up to 239 characters. The screen then asks you the length of field one, then the name. This process continues through the number of fields given. Finally, the screen will display your fields with names and length, and at the bottom will give you the option of correcting any or all of the fields, or starting

over again. Finally, you are asked to give the longest field you will sort or search. You must take care here, for this has a direct relationship on how many records you can hold in memory. You are told, rather casually in the manual to "Always enter a number higher than 9."

The program is very functional, practical, easy to understand and powerful. Sorting speed is about four minutes per 350 names and addresses and searches are quick and easy. The many modules make this program very useful for anyone with business applications, or where there is a bulk of information. The Replace module, for instance, makes it worthwhile for the union. Using this, one can change many records at once, with the same data placed in all records, or all records with a particular entry. The union can do the dues checkoff by entering those members who have not paid, and then placing a "paid" in the field for all others. Thus, if there are 56 non-payments in February, all the secretary has to do is enter an asterisk in a field for those individuals. Then, by telling the program, she can have Paid entered into the February field of all the rest. Later, after sorting them, she can have the program print out all names with an asterisk.

The program is recommended to anyone who needs a powerful data manager. It will do standard math functions, so adding within records or between fields is a possibility, making it possible to use the program as a check or budget file. Retail price is \$150.

The DB Master manual consists mostly of straight textual matter, with a few flowchart type illustrations and some sample screen illustrations. There is only one diskette provided, and if that is damaged or destroyed, a replacement is offered for \$15. There is a lot to absorb with the manual; the user should read it carefully and not be in a rush to get the program running. The DOS 3.3 PROMs *must* be installed in order for the program to boot.

Reset protector provided

The manual indicates that a "reset" protector, a rubber "O" ring, is provided with each program. This is a very handy little item, one that has saved me from disaster occasionally.

The program is mostly menu driven; that is, the commands are listed on screen within a particular chore or task and you are able to choose (usually by number) the task or function you wish to perform. There are some Control sequences, but not many.

The program is set up around primary and secondary key fields. These are the fields on which you will

ordinarily do your sorting or searching. But you are not limited to searches. The fields possible are standard, except that there is an auto-date field. This choice will automatically fill in with the present date in the Add Records mode. Also, you may have computed fields—those that you have set up to perform some math function, usually field to field. The manual in this section could have been clearer, although I eventually did everything correctly.

One feature that is especially attractive is the Default function. While the other three programs have such a function, only this one allows the user to establish his

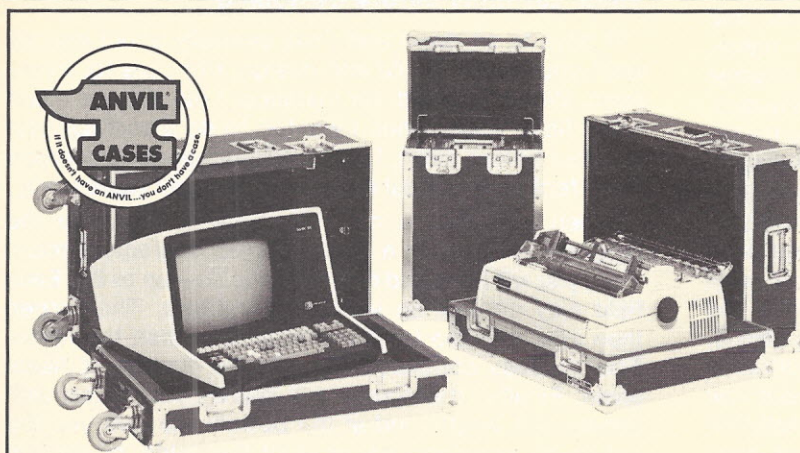
One feature that is especially attractive is the Default function.

particular default, then allows him to change that default temporarily (at one sitting, for instance). Typical applications might include information that occurs with enough frequency to justify having that default value already entered, as this saves much time and effort.

There is a Totals feature that gives you a running summary of all records that you want to find matching certain criteria. It will give you the count (# of records matching your criteria), sum (total of values found in the fields), average (sum divided by count) and the standard deviation (measure of how far the individual values deviate from the mean).

Creating a file is simple enough, but one should use caution, especially where the primary key is concerned. I found that it is best to use the sheets of special graph paper to lay out your screen form first. After you have entered the program and established the master password, you will be asked whether you want to protect the file with "read only" and/or "write and read" passwords. You must have two blank (or erasable) diskettes ready. The program will initialize these for you if necessary.

You will first be asked to enter your primary fields. You are not allowed computed fields or an auto-date field here, and you are limited to 10 fields and 35 bytes (assume 35 characters). Also, you must make sure that



Armored Transport.

Today's computer systems and components are incredibly reliable—until you have to move them from place-to-place. That's when the going gets tough. So, many computer users and manufacturers are investing in the toughest travel protection money can buy: ANVIL "A.T.A." Cases.

ANVIL "A.T.A." Cases are Airline Transport Association-approved. They pass rigid tests to assure that even the most delicate electronic equipment is thoroughly protected, even after dozens of round-trip shipments.

Write or call for the ANVIL Dealer in your area:
ANVIL CASES, INC., 4128 Temple City Boulevard, Rosemead, CA 91770-9990
Phone: (213) 575-8614

every key (all fields considered together as the primary key) is unique. That is, every record must have some variation of information within the fields that comprise the primary key. For example, if you had two fields as a primary key, and you had Jim Jones as a name in field one in two records, field two must reflect a difference somehow. If the second field was "Relationship" and both were "friends," you would have to put in something like "friend 1" and in the other record "friend 2." This is not difficult; it's worth mentioning here only to make the potential user aware that some thought should go into the creation of his file. It is wise to create at least one field that will enable you to ensure that the record is unique. If you do happen to put a record in that is a duplicate (in the primary key), the program should warn you.

You may send the screen contents to the printer for hardcopy using a CTRL P. Setting up a report format was a bit confusing and a bit understated in the manual, but DB Master does a better job in this regard than DataDex or Data Factory.

The potential for a wide range of applications exists in this program. I would like to see the manufacturer go one step further with this and make it usable with the popular 80-column boards. A suggestion to make the program complete is to make it compatible with a popular word processor. It would be nice to go into a report, pick out items within that report and designate them for inclusion into a particular file without having to type the information twice, or to take information from a file and throw it into a text file, much like form letter programs do. But it is a good program as is; its flaws are minor. Retail price is \$229.

Personal Filing and Report System is best

The packaging of the Personal Filing and Report System is the best and most professional looking. The system comes in two unique boxes containing manuals and diskettes. There are two diskettes in the Report box: one entitled Sortwork, and the other Report. In the other box containing the data base manager program, there are also two diskettes. One is the courtesy blank diskette, and the other is the program diskette, labeled PFS. In order to do any sorting with the Report portion, you must have dual drives.

One gets the impression right away that things are not going to be difficult upon looking at the manual. When so much care is taken with the packaging, one assumes such care will be taken with the most important part of the package, the program itself. It was.

There is one main menu that can be called almost any time using the ESC key. Like Data Factory and DB Master, this program is menu driven, but uses some CTRL key functions as well. They are easy to learn and are few in number.

The main menu gives you six choices: Create File; Add Form; Copy File; Search; Print; and Remove. The Report menu will give three choices: print a report; predefine a report; and set new headings. This is fairly standard, and easy to understand. What makes it even easier is the manual, which gives sample screens at almost every step.

Program use simple, but with limitations

Using the program is quite simple. While it is not as sophisticated as the others, and there are some limitations (such as file names of only eight characters or less), they are overcome by the ease of use, the clarity of the manual, and the simplicity of design.

Every file is on a single diskette and the user is told in the manual that 1,000 pages (meaning screen pages) can be stored on a diskette. Creating a file means little more effort than inserting the diskette and following instructions in the manual and on the screen. You are guided every step of the way, and it is possible to create a file without ever having looked at the manual.

Adding information into the records is easy. After choosing #2 (Add Form), you will get a blank form on the screen, with the headers or titles you've given to each field shown in reverse video. You fill in the form and if there are more pages to the form than one, you hit CTRL N and the next page is shown. If you designed the form with only one page, but for a particular record you need to add some comment or information, you can request an additional page with the CTRL N sequence. A blank page will appear with the word Attachment in the upper left corner in reverse video.

Printing out reports is as easy and functional as the rest of the program selections. You can have the report printed alphabetically or in a numerical order, up to 132 columns wide. You can do math functions within and on up to three columns (called derived columns). A CTRL A will allow you to view a report that is wider than 40 columns. Retail price for the Personal Filing and Report System is \$95 each.

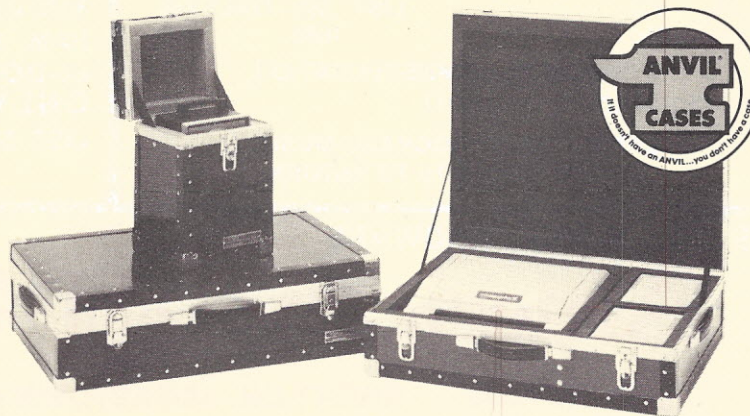
It is hard to choose one of the four programs as best, because there are attractive features about each—things that make each one unique. The user is advised to analyze his specific application areas in order to make the most suitable choice. □

Quick Getaway.

ANVIL's new FORGE II Computer Cases are just the ticket to get you and your computer components on the road—Fast! They're much lighter than our top-of-the-line "A.T.A." Cases, yet still provide a high degree of protection against both functional and cosmetic damage caused by impact during transit.

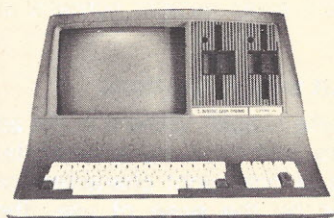
ANVIL FORGE II Computer Cases, like all ANVIL Cases are available for virtually every computer product on the market. And we can custom-design Cases to meet any special requirements you might have.

Write or call for the ANVIL Dealer in your area:
ANVIL CASES, INC., 4128 Temple City Boulevard, Rosemead, CA 91770-9990
Phone: (213) 575-8614



BRAINS-MAINFRAMES

SUPERBRAINS



SUPERBRAIN QD 64K

List \$3995 only \$2949



Z-89 48K

LIST \$2895 ONLY \$2099

Z-90 64K DD 3195 ONLY \$2489

NORTH STARS

MINICOMPUTER
PERFORMANCE
GREEN PHOSPHOR

OPTIONS:
GRAPHICS + CP/M
LIST \$3999
ONLY \$2999



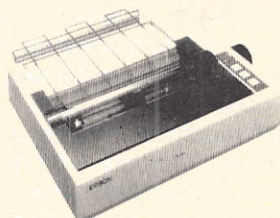
ADVANTAGE



MONITOR GREEN PHOSPHOR \$118
GREEN

TERMINALS Z-19 \$718

INTERTUBE III SUPER SMART \$710



EPSON

MX70 GRAPHICS	299
MX80 FT	598
MX-80	474
MX-100	749

ANADEx 9501	\$1290
NEC LETTER QUAL FRICTION & TRACTOR	CALL
ZENITH PRINTER Z-25 LIST 1595 ONLY	\$1256
DIP-84 FT GRAPHICS	\$ 595
STARWRITER LETTER QUAL FT	\$1824
EPSON MX70 WITH GRAPHICS SALE!	

6 ONLY	\$ 299
QANTEX W/BUFFER	\$1299

 400	LIST 399	ONLY 340
800	1080	799

WONDERFUL GAMES-EDUCATION	
RCA-COSMAC VP-711	199

GAMES-BASIC-PROGRAMS-MUSIC
GUIDED SATELLITE TO SATURN

TARBELL's Empire I, II, & III have two 8" disk drives. The I is single sided, the II is double sided, and the Empire III has one of the floppies replaced by an 8-Megabyte Hard Disk. FREE BUSINESS SOFTWARE EMP 1 \$4888 ONLY **\$3666**

CALIFORNIA COMPUTER 2210A

\$2195 ONLY **\$1795** Z80, 64K, I/O, DMA Disk controller + CP/M.

Model 300-1A is the larger system: 2.4 Mb 8", Z80, 64K, and optional OASIS, CP/M, or MP/M operating system. LIST \$5695 ONLY **\$4995**

MORROW DESIGNS Decision 1

OPTIONAL UNIX FREE CP/M. Multi user & Multi processing, 4 to 6 Mhz Z80, and optional Floating Point Processor, or Hard Disk 26 M6. A very powerful system at a saving.

LIST \$1725 ONLY **\$1380.**

GODBOUT COMPUPRO Big 8:

6MHz Z80, DMA Disk Controller, 32K fast static RAM, Interfacer 1 I/O board, + CP/M. LIST \$1995 ONLY **\$1595**

Super Sixteen 8085/8088 is the fastest combo 8-16 CPU. LIST \$3495 ONLY **\$2795**

SYSTEMS GROUP System 2812

runs CP/M or OASIS. Supports single user & multi-user & multi task. Up to 5 megabytes with 8" drives optional 10-megabyte hard disk. LIST \$5035 ONLY **\$3775**

AMERICAN SQUARE COMPUTERS is organizing a World-Wide FRANCHISE of Computer Stores. Be a WINNER! Join our SUCCESSFUL TEAM selling powerful Computers. Write or Phone us.

SEATTLE's 16 bit COMPUTER is here! 8 MHz 8086 CPU the fastest S-100 computer! 128K Static RAM, DD Disk Controller, 22-slot Main Frame, 86-DOS #2 128K LIST \$4185 ONLY **\$3349** #1 As above but 64K LIST \$3190 ONLY **\$2649**

WE SELL GOOD HARDWARE

American

919-889-4577

square



KIVETT DR. JAMESTOWN N.C. 27282

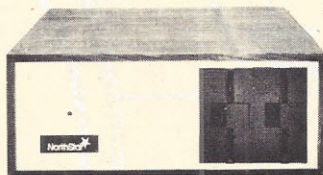
WE SELL GOOD SOFTWARE

Computers

919-883-1105

LOWEST PRICE - BEST QUALITY

NORTH STAR



North Star Horizon 2

2-5 1/2 Disk Drives
64K Double Den
Factory assem. & tested
Factory guaranteed
List \$4195

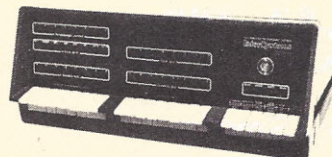
only **\$2875**

**POWERFUL NORTH STAR BASIC FREE
SUPERB FOR BUSINESS & SCIENCE**

FACTORY ASSEMBLED & TESTED	LIST	ONLY
HORIZON-2 32K-DOUBLE DEN	\$3695	\$2625
HORIZON-2-32K-QUAD DENSITY	\$3995	\$2799
HORIZON-2-64K-QUAD	\$4495	\$3150
HORIZON-1-64K-Q-HD5	\$6695	\$4685
HORIZON RAM ASSM 48K = \$679		64K = \$879
BIG SALE ON MULTI-USER TIME-SHARING		CALL
ENGLISH TO BASIC TRANSLATOR		\$ 99
NORTH STAR HARD DISK 18 Mb	\$5375	\$3923
NORTH STAR TIME SHARING MULTI-USER		CALL
ZBASIC 2 TO 5 TIMES FASTER!		\$350
SECRETARY WORD PROCESSOR		\$99
WORDSTAR WORD PROCESSOR		\$318
FLOATING POINT BOARD	\$399	\$319
OASIS MULTI-USER SOFTWARE	SAVE	CALL
CP/M FOR N* Extra features	\$230	\$220
MICRO MIKE SOFTWARE	SAVE	CALL
ECOSOFT ACCOUNTING \$355		MICROSTAT \$265
UCSD PASCAL II.0	\$199	\$159
EXTRA PRECISION BASIC		\$50
NORTHWORD	\$399	\$299
MAILMANAGER	\$299	\$224
INFOMANAGER	\$499	\$374
GENERAL LEDGER	\$999	\$749
ACCOUNTS RECEIVABLE	\$599	\$449
ACCOUNTS PAYABLE	\$599	\$449
INVENTORY	\$999	\$749
ORDER ENTRY	\$999	\$749

InterSystems

ITHACA INTERSYSTEMS 2A



Z-80A CPU 4 MHz
64K Dynamic RAM
Front panel
V I/O—with interrupts
FDCII Disk Controller
20 slot motherboard

LIST \$3795 **ONLY \$2839**

PASCAL/Z + THE FASTEST PASCAL \$375

	LIST	ONLY
PASCAL SYSTEM 128K 2 DRIVES	\$7295	SAVE
CACHE BIOS SYSTEM 128K 2 DRIVES	\$6995	CALL
CP/M SYSTEM 64K 2 DRIVES	\$6295	SAVE
DPS-1 MAINFRAME WITH Z80A	\$1795	CALL
Z80 MACRO ASSEMBLER	\$125	SAVE
SPELL—PERFECT SPELLING	\$295	CALL
COMPARE—UTILITY SOFTWARE	\$295	SAVE
INTEREDIT—TEXT EDITOR	\$295	CALL

MORROW 8" DISK

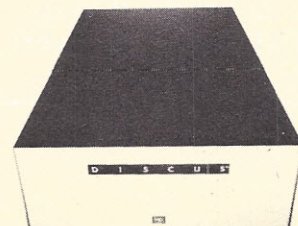
DISCUS 20 + CP/M® 600K ONLY \$848

DISCUS 2 + 2 + CP/M® 1.2 MEGA B. \$1099

ADD DRIVES 2D = \$599 2 + 2 = \$795

DISCUS 20-DUAL + CP/M® ONLY \$1388

FREE MICROSOFT BASIC FROM MORROW WITH
DISCUS SYSTEM OR HARD DISK



MORROW HARD DISK
26,000,000 BYTES!!
LIST \$4495 ONLY \$3395
CP/M® IS INCLUDED!

AMERICAN SQUARE COMPUTERS is organizing a
World-Wide FRANCHISE of Computer Stores. Be a
WINNER! Join our SUCCESSFUL TEAM selling
powerful Computers. Write or Phone us.

SAVE ON MEMORY AND PROGRAMS

SYSTEMS MEMORY 64K A&T	\$549	CORVUS HARD DISK	SAVE
SYSTEMS MEMORY 64K BANK	684	SSM VIDEO BRD VB3 4Mhz	412
MICROANGELO	985	SPECTRUM COLOR ASM	326
ITHACA MEMORY 8/16 BIT 64K	845	EZ-CODER English to BASIC	99

ECOSOFT FULL ACCOUNTING	355	Which Computers are BEST?	FREE
CAT NOVAION MODEM	169	INSURED SHIPPING AT LOW RATES	
MEMORY MERCHANT 16K	159	CALL FOR LATEST PRICES, DETAILS	
WICAT 68000 16-BIT	CALL	WE BEAT ADVERTISED PRICES	

FACTORY GUARANTEES

square

EXPERT ADVICE

American



Computers

919-889-4577

KIVETT DR. JAMESTOWN N.C. 27282

919-883-1105

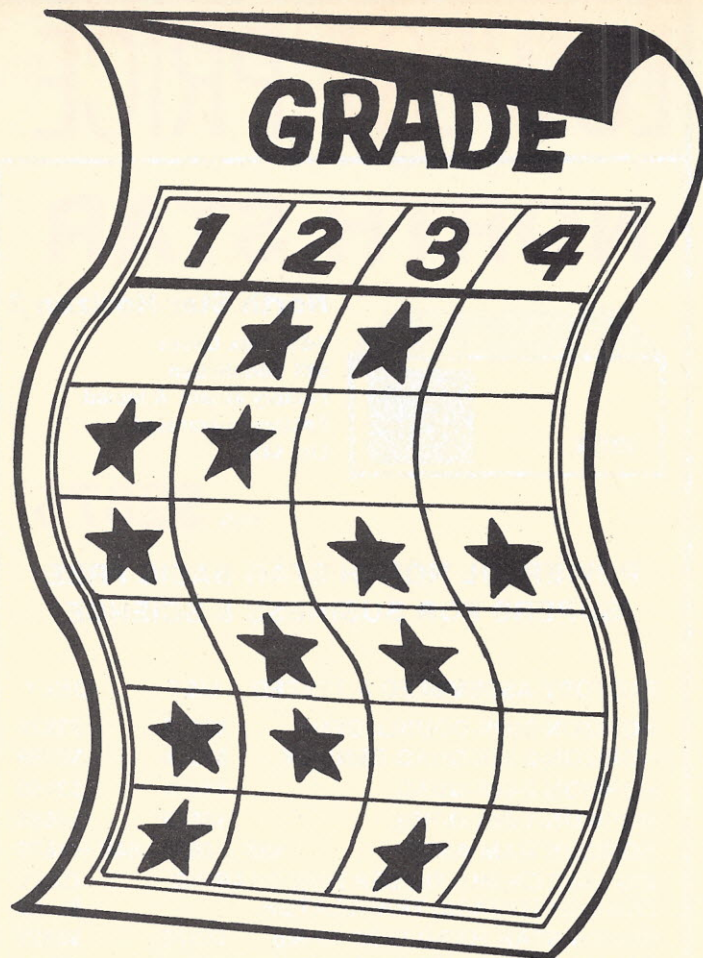
CALCSTAR:

Good Grades for Flexibility

by Rocky Smolin

I love VisiCalc (Personal Software, Sunnyvale, CA). That puts me in a big crowd. As soon as I saw it, I knew it was the greatest software idea since the data base. It has fired the imagination of everyone I have shown it to, regardless of how little they have known about computers. Even though it had a few shortcomings, I put it to work for me at once, and have relied on it ever since.

Of course, every good program encourages imitators, and, hopefully, new generations of improved, enhanced, speedier, friendlier versions. This is exactly what has happened to VisiCalc. One of the latest to hit the marketplace is a program called CalcStar, marketed by MicroPro (San Rafael, CA). I have only worked with the first version of VisiCalc, so my impressions of CalcStar were formed in comparison to that.



```

*****
* -Cursor Movement- | -Commands- ; followed by | -Misc- *
* <CR> Right | A Auto F Format L Load R Recalc * Extend | @ Curs Pos *
* ^S Left ^D Right | C Copy G Goto M Merge S Save = Lock | ? Evaluate *
* ^E Up ^X Down | D Delete H Help O Order W What ? Space | ^ Data Togl *
* ^Z Col A next row | E Edge I Insert P Print <TAB> Goto | <ESC>Cancel *
*Col> |A |B |C |D |
*Row+-----+
* 1:> <
* 2:
* 3:
* 4:
* 5:
* 6:
* 7:
* 8:
* 9:
* 10:
* +-----+
* cursor: A1 current: A1
*
* current|| type:
* data || contents:
* edit:
*
*****

```

Figure 1. Main menu

ATTENTION Data Base Users!

The latest edition of the most up-to-date, economical data base reference guide is now available.

The Directory of Online Information Resources, 9th Edition

The **Directory** covers over 350 of the most popular and useful online data bases available in the **United States**. Widely recognized as a standard reference in its field, it is regularly consulted by thousands of individuals and organizations using data base resources.

The **Ninth Edition** offers:

- concise descriptions of each data base, including coverage, file size, unit record, producer, vendors, and pricing information
- complete subject and vendor indexes
- addresses and phone numbers of all producers and vendors

The **Directory of Online Information Resources** expands with each semi-annual edition.

To: **DATA DYNAMICS TECHNOLOGY**, P.O. Box 1217, Cerritos, CA 90701

Name (Print) _____

Address _____

City _____ State _____ Zip _____

Please send _____ copy(ies) at \$18.50 each Total \$ _____

*Tax \$ _____

Shipping & Handling Charges
U.S. \$2.75 ea. Foreign \$4.50 ea.

Shipping & Handling \$ _____

Total Enclosed \$ _____

☐ Check or M.O.
(U.S. Funds drawn
on a U.S. bank)

_____ Expiration date _____

Signature _____

*California residents add 6% sales tax. Availability and prices quoted subject to change without notice.
Please allow six weeks for delivery. You may photocopy this page if you wish to keep your INTERFACE AGE intact.
Orders cannot be shipped unless accompanied by payment, including shipping and handling and tax where applicable.

DATA DYNAMICS TECHNOLOGY, A Division of INTERFACE AGE Magazine
Place your direct order today! Call (800) 423-6665, Ext. 10

These financial-planning products are essentially electronic worksheets. The user defines the column and/or row titles and contents, and can easily change the contents of any position or cell on the worksheet. In addition, the user can define the contents of a given position on the worksheet as a function of some other position. Thus, a worksheet containing an income statement might define the contents of the cell representing net income as the contents of the cell containing net revenues minus the contents of the cell containing net expenses.

Further, since net income is defined as a function of revenue minus expense, any change to either of those figures will automatically change the net income figure. So it's easy to play 'what if' games with your worksheets, adjusting revenues and expenses to see what the effect is on income. An additional powerful feature of these programs is the ability to copy or replicate some value or values down a column or across a row. Thus, after lining up this year's income statement in column 1 of a worksheet, you could easily extend every one of the revenue and expense lines into the next five columns, increasing each figure by 10% over the previous column. Instantly, you'd have a five year pro forma projection of your income statement, based on the assumption that both revenues and expense items will increase 10% each year.

The possibilities are unlimited: financial statements, inventory tracking, investment management—any task where you would normally write columns or rows of figures down on paper.

For its manual, CalcStar gets a strong B. Although the style is conventional, and consists almost entirely

of tutorial, the type is single-spaced, giving each page a dense and intimidating textbook-like appearance.

However, the contents are very well-written. A minimum of technical talk, and thorough instructions on the use of each program feature, make this manual worth emulating. Fortunately, the operation and application of the program is fairly simple, so that about four or five

These financial-planning products are essentially electronic worksheets

hours of diligent study are enough to get all the way through CalcStar's various features.

Like all software running under CP/M, CalcStar can be used on a wide variety of terminals, each with its own unique characteristics and control codes. It becomes necessary, then, for the vendors of CP/M software to find a way for users to easily configure the canned package to their particular video display.

MicroPro has implemented a nearly ideal solution to this problem. After a few words of introduction, the user is directed to Appendix D in the manual, which instructs one to run a program called INSTCS. This program displays a list of 26 different terminals. One

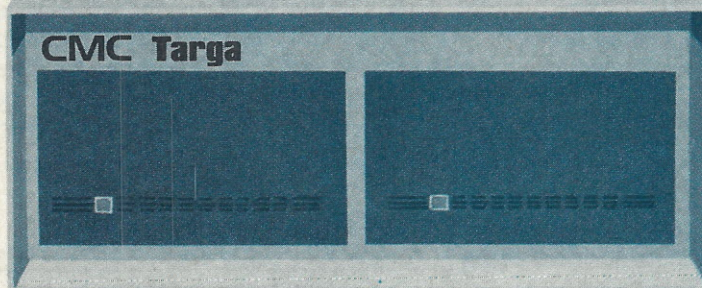
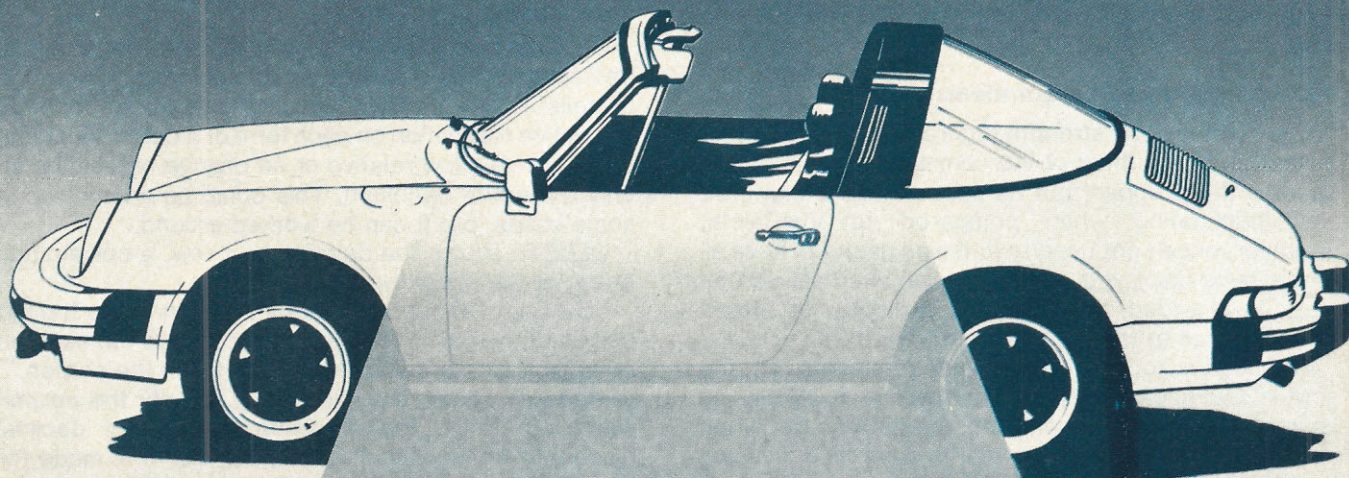
```

*****
*
*
*Col>|A      |B      |C      |D      |
*Row+-----+
* 1:>      <
* 2:
* 3:      PART #    PART NAME    SUPPLIER #
* 4:      -----
* 5:
* 6:      12345    1/4" BOLT      35
* 7:      12346    3/8" BOLT      35
* 8:      12347    1/2" BOLT      35
* 9:      12348    5/8" BOLT      83
* 10:     12349    3/4" BOLT      83
* 11:     12350    7/8" BOLT      83
* 12:     12351    1" BOLT       83
* 13:     12353    1 1/4" BOLT    35
* 14:
* 15:
* +-----+
* [ EXAMPLE] cursor: A1      current: A1      L-R
*
* current||      type:
* data   ||      contents:
*          edit:
*      CalcStar (c) 1981 c/o MicroPro Int'l CS9999xx rv_A01 [LSI ADM-3A]
*****

```

Figure 2. Alternate screen mask

TARGA



5-10-20 Megabytes in an add-on hard disk for:

**IBM Personal Computer • Xerox 820
Apple • SuperBrain • Heath-Zenith
TRS-80 Models II & III**

Targa, a truly high performance design, whether by Porsche or by CMC. Targa hard disk system, a significant extension to the storage capacity of your micro-computer, at an unheard of price/performance ratio. Suggested list for 5 mb:

only \$2895.

Targa 5	6.38 Mbytes unformatted, 5 MB formatted. Upgradeable to 10 MB
Targa 10	12.8 Mbytes unformatted, 10 MB formatted. Upgradeable to 20 MB formatted
Targa 20	20 Mbytes formatted, 25.6 MB unformatted

Our Targa Winchester-type, hard disk drives are offered in desk-top dimensions of 15" x 5¼" x 13½". It comes complete with cables, software and interface. Call or write for complete specifications and/or the dealer nearest you. Dealer inquiries invited.

CMC INTERNATIONAL

A Division of Computer Marketing Corporation

CIRCLE INQUIRY NO. 15

11058 Main • Suite 220 • Bellevue, WA 98004 • Phone (206) 453-9777 • Telex: 152556 SEATAC

Call Toll-Free 1-800-426-2963

simply picks the terminal one is using and CalcStar installs itself. If your terminal is not listed, the program prompts you for the codes it requires. In either case, the prompts are well-written and the program is as near foolproof as possible.

The introduction tells you correctly to run the program called CS. It also gives you an eight-page summary of the operation of CalcStar—good for someone familiar with VisiCalc or one of its cousins, impossible for the first time user. If one turns directly to another introduction following the table of contents, one is instructed to execute CalcStar, which is not on the disk. It has been renamed CS, but the manual has not been updated. For those unfamiliar with computers or CP/M, this would stop them cold.

Most commands in main menu

The main menu's strength (figure 1) is also its weakness. It contains most of the commands one needs to operate the program, but its appearance is cluttered and intimidating when compared to VisiCalc's. However, once I got used to it, it was useful to have all these items displayed. In addition, an alternate screen mask is provided, which allows a display of fifteen rows, instead of the standard ten (figure 2).

In addition to the operational reminders on the screen, additional help information is available by keying ';H'. Figures 3 and 4 show what you get when you ask for this help. The cursor is controlled by using the <CTRL> key and the diamond formed by the keys E, D, X and S. Data entry is simple enough, and the ability to left, right, or center-justify your text makes for nice looking reports.

All the commands worked as they should have. The keystrokes for initiating various functions are not particularly obvious, but (as with all mnemonic codes) once they're learned, they become automatic. At that point, the ability to execute the desired command with a minimum of keystrokes becomes a big plus. Following are descriptions of each command.

AUTO is used to edit entries that are subject to frequent changes. One first flags those entries one would like to edit frequently. Then, when the Auto mode is turned on, the cursor automatically jumps from one flagged cell to another, saving the user the trouble of hunting around the worksheet for the values that need altering.

COPY allows you to copy or replicate the values or definitions in one cell or range of cells to another range of cells. Unlike VisiCalc, which allows either constant or relative replication on each term of a cell's definition, CalcStar will allow relative or no change replication on only the entire definition. This could be a handicap in some cases, but it can be worked around.

DELETE allows the deletion of a row, a column and entry, or the entire worksheet.

EDGE sets the current cursor position to the top left corner of the display window, and displays the next ten rows, and all the columns that will fit on the screen.

FORMAT allows the user to: 1) specify the column width; 2) define the precision (number of decimal places) to be displayed; and 3) set the form mode for the AUTO command. Unlike VisiCalc, which allows the column width to be defined only once for all the columns in the array, CalcStar allows different column widths to be defined for each column. The precision

```

*****
*
*      ——— Help page 2 ———      Hit <RETURN> to continue
*      ——— Extended commands ———
*
* these commands are accessed by hitting the ';' key
*   Auto      enter Automatic entry mode. <ESC> will abort.
*   Copy      Copy a (range) entry to another (range) entry
*   Delete    Delete a row, column, entry or the whole array
*   Edge      set the window top left corner to the cursor position
*   Format    change column size or precision under cursor
*   Goto      move cursor to a specific column and row
*   Help      display this information
*   Insert    Insert a row or column into the array
*   Load     Load a file into the array
*   Merge     overlay file onto array
*   Order     Change the evaluation (column/row) order of the array
*   Print     Print a report
*   Quit      exit the report generator
*   Recalculate recompute entry at cursor or whole array in current order
*   Save      Save the array to a file
*   What      if text, prints 1st column & row entries of cursor position
*   ?         print approximate storage space in terms of entries
*   =         lock column A and row 1 onto display
*   *         Switch between 10 (with menu) and 15 row screen display
*
*****

```

Figure 3. Help information

BOY, IS THIS COSTING YOU.

It's really quite basic: time is money.

And BASIC takes a lot more time and costs a lot more money than it should every time you write a new business software package.

Especially when you could speed things up with dBASE II.

dBASE II is a complete applications development package.

Users tell us they've cut the amount of code they write by up to 80% with dBASE II.

Because dBASE II is the high performance relational database management system for micros.

Database and file handling operations are done automatically, so you don't get involved with sets, lists, pointers, or even opening and closing of files.

Instead, you write your code in concepts.

And solve your customers' problems faster and for a lot less than with BASIC (or FORTRAN, COBOL or PL/I).

dBASE II uses English-like commands.

dBASE II uses a structured language to put you in full control of your data handling operations.

It has screen handling facilities for setting up input and output forms.

It has a built-in query facility, including multi-key and sub-field searches, so you can DISPLAY some or all of the data for any conditions you want to apply.

You can UPDATE, MODIFY and REPLACE entire databases or individual characters.

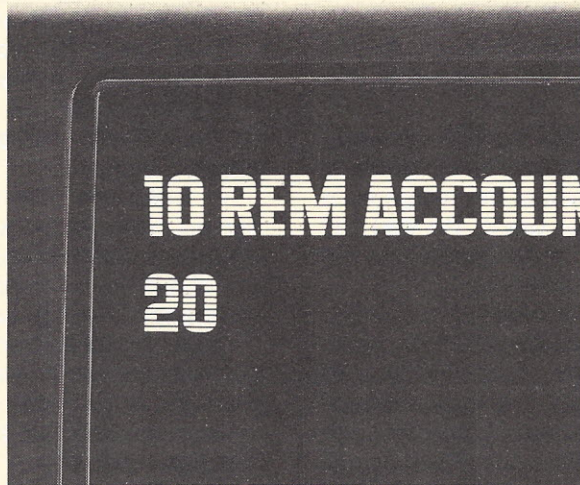
CREATE new databases in minutes, or JOIN databases that already exist.

APPEND new data almost instantly, whether the file has 10 records or tens of thousands.

SORT the data on as many keys as you want. Or INDEX it instead, then FIND whatever you're looking for in seconds, even using floppies.

Organize months worth of data in minutes with the built-in REPORT. Or control every row and column on your CRT and your printer, to format input and output exactly the way you want it.

You can do automatic calculations on fields,



records and entire databases with a few keystrokes, with accuracy to 10 places.

Change your data or your entire database structure without re-entering all your data.

And after you're finished, you can protect all that elegant code with our run-time compiler.

Expand your clientbase with dBASE II.

With dBASE II, you'll write programs a lot faster and a lot more efficiently. You'll be able to write more programs for more clients. Even take on the smaller jobs that were out of the economic question before. Those nice little foot-in-the-database assignments that grow into bigger and better bottom lines.

Your competitors know of this offer.

The price of dBASE II is \$700 but you can try it free for 30 days.

Call for our Dealer Plan and OEM run-time package prices, then take us up on our money-back guarantee. Send us your check and we'll send you a copy of dBASE II that you can exercise on your CP/M system any way you want for 30 days.

Then send dBASE II back and we'll return all of your money, no questions asked.

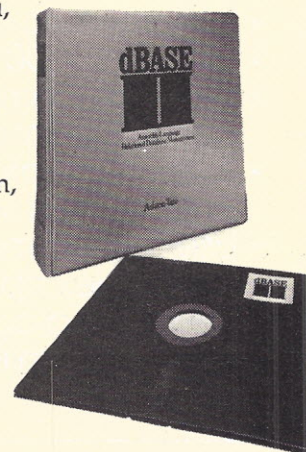
During that 30 days, you can find out exactly how much dBASE II can save you, and how much more it lets you do.

But it's only fair to warn you: business programmers don't go back to BASIC's.

Ashton-Tate, 9929 Jefferson, Los Angeles, CA 90230. (213) 204-5570.

Ashton-Tate

©Ashton-Tate 1981



definition worked, but the rounding that showed in the manual did not work on the screen. In other words, a number like 1.58 was displayed as 1.5, when the precision was set to 1, instead of 1.6.

GOTO allows the user to move the cursor directly to the desired cell. The TAB key performs the same function.

INSERT allows the user to insert a row or column anywhere on the worksheet, moving the remaining entries down or to the right, and adjusting the cell definitions accordingly.

LOAD loads a file from disk into memory. A nice feature here is the ability to specify the starting location of the array. Thus if you had originally keyed figures into columns 1-5, you could load this same data into columns 6-10, if you liked.

MERGE allows you to load a disk file into the worksheet, overlaying the current contents of the worksheet's cells, but leaving other cells outside of the merge file's boundaries untouched. By judicious use of the load and merge commands, one can get quite creative in the piecemeal assembly of complex worksheets.

ORDER changes the evaluation order of the array, either column/row or row/column. This feature is useful and even necessary in some cases. As the recalculate command moves through the sheet in its usual order of evaluation (left-to-right, top-to-bottom), it may encounter a formula in a cell that depends on a value in a cell that has not yet been evaluated, so that the result would be incorrect.

PRINT requires one to respond to several prompts, which provide lots of flexibility in specifying the format of the output. In addition to specifying the top-left and bottom-right corners of the area to be printed, CalcStar

allows the user to print to a disk file. The form length and width can be specified, as well as the ability to pause between pages. Finally, one can set a switch to print the column headings on the top of the page, whether or not one is printing from the top of the sheet.

QUIT exits CalcStar to the CP/M operating system.

RECALCULATE triggers the recalculation of either the entry at the cursor's current position or the entire worksheet. The true power of electronic worksheet products lies in this ability—to modify one or more entries, then to quickly recalculate all other entries that are functions of the altered values.

SAVE keeps the worksheet on the disk under a file name specified by the user.

? tells the user how many more entries can be added to the current worksheet based on the amount of memory available.

= locks the first row and first column onto the screen. Since this is where you are most likely to have entered column or row descriptions (no matter where the cursor is moved in the array), these descriptions always show on the screen.

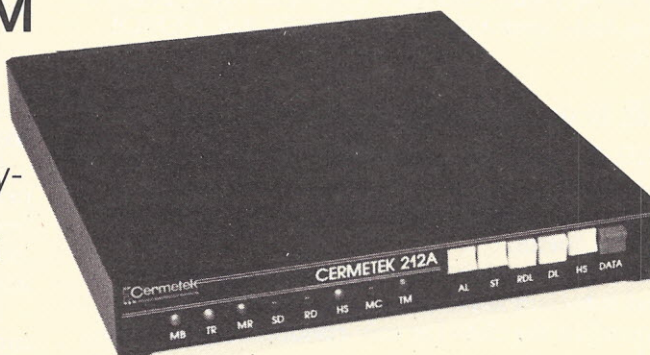
Given the applications of a program like this, there are several common operations that one can expect to be required to perform, such as adding up a column of figures, counting the number of entries in a list, taking averages, etc. These functions are built into CalcStar and can be invoked simply by including them in a cell's definition. Consider the expression '+SUM(C5>C20)'. The sum of all the numerical values in rows 5 -20 of column C would be placed in that cell's definition. If one of those values is altered and the recalculate command invoked, the cell containing the sum would automatically

BUY A 212A-TYPE MODEM AND GET A \$212 REBATE.

Now, as an introductory offer, when you buy Cermetek's new fully-featured Bell 212A compatible modem, the CERMETEK 212A, you'll get a \$212 rebate.

Just consider the CERMETEK 212A's features:

- Integral Auto-Dialer
- 0-300 or 1200 BPS Operation
- Bell 212A Compatibility. Bell 103/113 compatibility or 0-300 BPS mode
- Auto-originate/Auto Answer/Auto-Speed sense
- User option menu
- Full Duplex operation
- Seven (7) diagnostic modes
- One year limited warranty



To get your CERMETEK 212A modem, contact:

A.C.T.
Rocky Mountain
2640 Youngfield
Lakewood
CO 80214
(303) 233-4431

A.C.T.
15800 Addison Rd.
Addison TX 75001
(214) 980-1888

P & L Associates
11 Laura Lane
P.O. Box 481
East Setauket
NY 11733
(516) 221-7623

Offer expires September 30th, 1982. Limited to two modems per customer.

Product Highlight: Dynabyte 5505.



Multiuser microcomputers up to 16 MB Winchester from \$6,995*

Designed for performance.

When it comes to Winchester performance, you just can't buy a better microcomputer than the Dynabyte 5505. Our 5505 is loaded with industry standards that are integrated and enhanced—and make systems development easy and cost efficient. Take our 5 1/4" Winchester disk drive. We give you the option of three storage capacities, 6, 10, and 16 MB. And the fast access is ideal for multiuser environments.

For easy upgradability, the 5505's modular architecture lets you add performance as you need it. Its enhanced MP/M multiuser operating system gives you the speed of a mini with the ease and price of a micro. Attached to the standard RS-232 ports, the system allows you to expand and support up to 8 terminals and 16 printers.

All these features are attractively packaged in a single, compact, table-top box designed for quiet operation.

You've got to see it to believe it.

All 5505s are backed by Dynabyte's engineering expertise and reputation for high quality. And they're available now in volume production. We'd like to tell you more. Call or write Dynabyte, 521 Cottonwood Drive, Milpitas, CA 95035 (408) 263-1221 now!

*5505-A1-64K, 6MB Winchester, .5MB floppy—\$6,995 (list)
5505-B1-64K, 10MB Winchester, 1MB floppy—\$7,695 (list)
5505-C1-64K, 16MB Winchester, 1MB floppy—\$8,495 (list)

CP/M and MP/M are registered trademarks of Digital Research, Inc.
OASIS is a registered trademark of Phase One, Inc.




```

*****
*      — Help page 1 —      hit <RETURN> to continue      *
*      Main entry mode      *
* Cursor is controlled with keys E, D, X, and S with the <CTRL> key held down. *
* Direction is up, right, down, and left in that order. (Control Diamond) *
* <RETURN> moves the cursor right if no data has just been typed. *
* <CTRL> Z moves the cursor to the next row, first column. *
* *
* Data Entry: digits 0-9, +, - signal numeric entry. *
* alphabetic characters or blank signal text entry. *
* /, followed by R, C, or L justifies text right, centered, or left *
* ^ is used to switch between text and numeric if needed. *
* /= duplicates entry across column. /P causes page break for print *
* ! sets special entry mode for arithmetic modification of input. *
* *
* Equations may contain numeric data, cell references, and functions. *
* four-function arithmetic (+,-,*,/) may be used with any of these. *
* @ refers to current cell location. Type one character and then *
* move cursor to put in cell references without typing them. *
* ! following a cell reference holds it constant in relative copy *
* functions include: sum, avg, cnt, abs, exp, log, ln, min, max, *
* sqrt, regr, slope, proj, depd. *
* *
*****

```

Figure 4. More help information

be modified to reflect the new sum. In addition to the SUM, CalcStar has other built-in functions:

- CNT —the number of numeric items in a given range
- AVG —the mean value (SUM/CNT)
- MAX —the maximum value in the list
- MIN —the minimum value in the list
- SQRT —the square root
- LOG —the base 10 logarithm
- LN —natural logarithm
- ABS —absolute value
- EXP —exponent

Four additional built-in functions allow the user to perform linear regression type forecasting on a set of figures—one of the most powerful features of this package, and one of the most useful functions of any CalcStar-type product.

REGR performs linear regression on ranges of specified independent and dependent variables.

PROJ allows the entry of a value for an independent variable and calculation of the best estimate of the dependent variable.

DEPD allows entry of a value for a dependent variable and calculation of the best estimate of the independent variable.

SLOPE has the system enter the slope of the linear equation computed from the regression function.

The biggest advance over the original VisiCalc in this package is the ability to define the contents of a cell not just as a function of one or more other cells, but also to invoke 'if...then...else' logic in the definition. Thus you could say the equivalent of "if the value of net income is greater than some amount set tax rate equal to 25%, else set it equal to 15%". This 'if...then'

capability greatly extends the usefulness and application of the program.

You can create outputs from CalcStar that can be used by Basic, DataStar, WordStar, MailMerge, and SuperSort, greatly extending the usefulness not only of CalcStar, but also other MicroPro products.

Being used to VisiCalc, I found the slow speed of CalcStar's display to be its biggest drawback. In addition, when one moves the cursor off the screen, instead of rolling the data, CalcStar re-displays the entire screen, making it awkward to scroll through the data sheet.

The smaller size of the display window was also a drawback in this reviewer's mind. The worksheet, regardless of the amount of memory available is limited to 127 columns and 255 rows. I also missed the ability to invoke operating system functions like directory listings from within the program.

Finally, the index in the manual, which was not as complete as it could be, referred one to the section number (i.e. II.16 for section 2, topic 16), instead of page number. This caused a lot of extra page turning when trying to locate the write-up of a particular topic in the manual.

Overall, CalcStar gets good grades simply for working as advertised. A lot of software on the market today fails to meet this test. Although slow in a few functions, the program is quite flexible and complete. With the addition of the linear regression forecasting, it is a very powerful program in its genre. For those who have one or more of MicroPro's compatible packages, CalcStar would probably be the program to choose. Its interfacing ability makes it a much more powerful program than it first appears to be. □

New
from GDC

THE ONLY BUSINESS-FEATURED MODEM UNDER \$200

The GDC 103J-L

The only low-cost 300 bps dial modem
with the same features found in
modems which support business applications
...or your home computer.



Features:

- Operates over all telephone lines — even lines not usable by line powered units
- Data flow indication shows transmit and receive activity
- Carrier detect indication



- Answer/Originate mode is automatically selected — no need to manually switch
- Self diagnostics with Analoop® — loops data from terminal through modem to check operation
- Same high quality as our complete line of DataComm products.

For more information contact the experts at:



**General
dataComm**

APRIL 1982

**General DataComm
Industries, Inc.**

One Kennedy Avenue
Danbury, CT 06810
(203) 797-0711

**General DataComm
Industries (Canada) Ltd.**

Suite 410 West
2255 Sheppard Avenue East
Willowdale, Ontario M2J 4Y3
(416) 498-5100

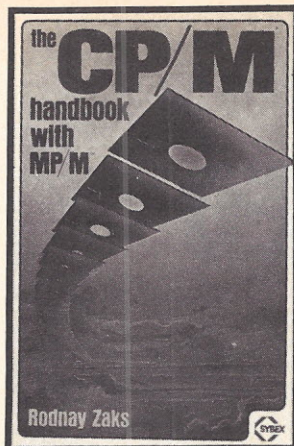
General DataComm (UK) Ltd.

Toutley Road
Wokingham, Berkshire
RG11 5QN, England
(0734) 791 444

U.S. Sales Offices: Atlanta, GA (404) 955-0682; Chicago, IL (312) 298-4181; Dallas, TX (214) 980-0803; Detroit, MI (313) 540-4110; New York, NY (212) 423-5080; San Francisco, CA (415) 569-3115; Santa Ana, CA (714) 957-0244; Washington, D.C. (301) 596-0888. **U.S. Telecomm Sales:** Atlanta, GA (404) 971-5914; Chicago, IL (312) 653-9262; Green Valley, IL (309) 352-6420; Santa Ana, CA (714) 957-0244; Dallas TX (214) 241-5383; Indianapolis, IN (317) 849-7113; Seattle, WA (206) 355-4800.

CIRCLE INQUIRY NO. 41

INTERFACE AGE 111



CP/M Handbook **Rodnay Zaks**

A complete guide and reference handbook for CP/M, the industry standard in operating systems. Step-by-step instruction for everything from turning on the system and inserting the diskette to correct user discipline and remedial action for problem situations. Included are a comprehensive description of all CP/M facilities and resources, instructions for advanced operations and complete discussions of all versions of CP/M up to and including 2.2, MP/M and CDOS.

Order No. 0-89588-065-2 \$14.95

Inside BASIC Games **Richard Mateosian**

This book teaches you how to design error-free interactive BASIC programs including games and other real-time situations. Eight computer games are described in detail, illustrating how they were designed and developed in BASIC. All facets of a game program design, including program structuring, cursor positioning, randomization and other concepts are discussed. Programs for games such as Hangman, Ten-Key Flicker and Taxman are coded in Microsoft BASIC. Versions are also provided for PET/CBM, Apple II and TRS-80.

Order No. 0-89588-055-5 \$14.95

Don't (Or How to Care for Your Computer)

Rodnay Zaks

Most "computer failures" are caused by ignorance or negligence. This is the first book that explains how to eliminate common computer problems. In plain language, with numerous illustrations, this book tells all the do's and don'ts of the care, preservation and correct operation of a small computer system. You'll find chapters on each piece of hardware and software as well as safety, security precautions and help for problem situations. If you want your computer to work and keep working, this book is indispensable.

Order No. 0-89588-065-2 \$11.95

The PASCAL Handbook **Jacques Tiberghien**

A complete reference guide for every PASCAL instruction, function, operator or reserved word. Each symbol or word is described in its own section which includes syntax, definition and examples of its use.

Order No. 0-89588-053-9 \$18.95

DISCOVER OF SYBEX

Introduction to Word Processing **Hal Glatzer**

This book explains in plain language what a word processor can do, how to use one, how it improves productivity—especially in businesses that use lots of words—and how to buy one wisely. Find out just how electronics has revolutionized the handling of words and information. A description of the commonly used word processing terms is included in a 20 page glossary. If you are thinking about buying a word processor, have just started using one, or want to get the most from the one you have, this is the book for you.

Order No. 0-89588-076-8 \$12.95

6502 Applications Book **Rodnay Zaks**

This book presents real-life application techniques for any 6502-based micro-computer board. It teaches you how to connect the board to the outside world and implement practical applications. Programs range from a complete home alarm system to industrial applications.

Order No. 0-89588-015-6 \$12.95

6502 Games Book **Rodnay Zaks**

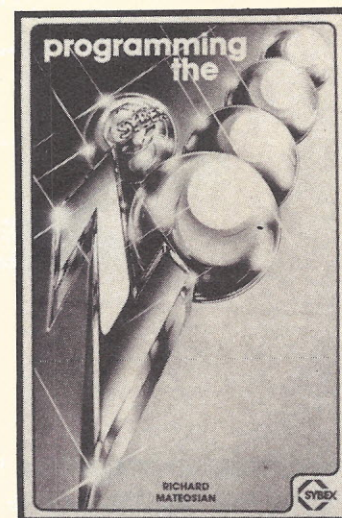
This book is designed as an educational text on advanced programming techniques. It presents a comprehensive set of algorithms and programming techniques for common computer games. All the programs are developed for the 6502 at the assembly language level.

Order No. 0-89588-022-9 \$12.95

Programming the Z-80 **Rodnay Zaks**

Covers the essential aspects of the Z-80, and brings the reader to where he/she can write complete application programs.

Order No. 0-89588-069-5 \$15.95



Programming the Z8000 **Richard Mateosian**

This book describes, in detail, the architecture and function of the Z8000 and its family of support chips. It provides an introduction to machine language programming using the Z8000, and presents many sample programs.

Order No. 0-89588-032-6 \$15.95

Programming the 6502 **Rodnay Zaks**

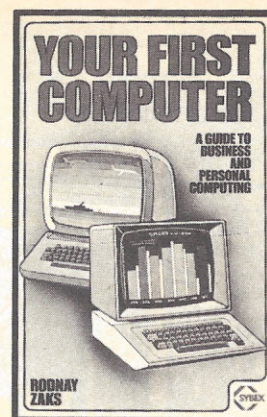
This book covers all aspects of programming the 6502 from basic concepts to advanced data structures. Designed as a progressive course with exercises to test the reader at every step, resulting in the ability to write complete applications programs.

Order No. 0-89588-046-6 \$13.95

THE LAND



DATA DYNAMICS TECHNOLOGY



Your First Computer Rodnay Zaks

This book explains what a computer system is, what it can do, how it works, and how to select the various components and peripheral units. Written in everyday language, the book is a comprehensive and enlightening guide to the world of small computers. Whether you are using a computer, thinking about using one or considering purchasing one, this book is indispensable.

Order No. 0-89588-045-8

\$8.95

Apple PASCAL Games

Douglas Hergert and Joseph T. Kalash

This book presents a collection of popular microcomputer game programs written in Apple PASCAL. Each game includes a complete description of the rules of the game, a guide to understanding the program, a "structure chart" graphically illustrating the organization of the program, and a listing of the entire program. You are challenged not only to play the game, but to discover how games are implemented on the computer. For the game player who knows BASIC, this book can be an informal introduction to PASCAL. For those who already know PASCAL, here is a collection of games written in the programming language that is gaining popularity among computer enthusiasts everywhere.

Order No. 0-89588-074-1

\$14.95

Fifty BASIC Exercises

J.P. Lamoitier

This book is designed to teach BASIC through actual practice. It presents graduated exercises in mathematics, business, operations research, games and statistics. Each exercise contains a statement and analysis of the problem, a solution with a flowchart and comments, and a program implementing the solution accompanied by sample runs. Besides allowing you to check your understanding and progress while learning, this method teaches problem solving in a top-down manner. This book stresses programming style and the reasons behind each design decision.

Order No. 0-89588-056-3

\$12.95



Introduction to PASCAL

Rodnay Zaks

A step-by-step introduction for anyone wanting to learn the language quickly and completely. Each concept is explained simply and in a logical order. All features of the language are presented in a clear, easy-to-understand format with exercises to test the reader at the end of each chapter.

Order No. 0-89588-066-0

\$14.95

Microprocessors: From Chips to Systems

Rodnay Zaks

This book is a basic text on microprocessors for anyone with a technical or scientific background. It covers all aspects of microprocessing, from basic concepts to advanced interfacing techniques.

Order No. 0-89588-042-3

\$14.95

DATA DYNAMICS TECHNOLOGY P.O. Box 1217, Cerritos, CA 90701

Name (Print) _____

Address _____

City _____ State _____ Zip _____

Please send me:

Order #	Qty	Price	Total	Order #	Qty	Price	Total

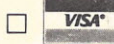
Shipping & Handling Charges \$2.00 ea. U.S., \$5.00 ea. Foreign

TOTAL ORDER \$ _____

* TAX \$ _____

SHIPPING & HANDLING \$ _____

TOTAL ENCLOSED \$ _____



_____ ☐ Check or M.O. (U.S. Funds drawn on U.S. bank)

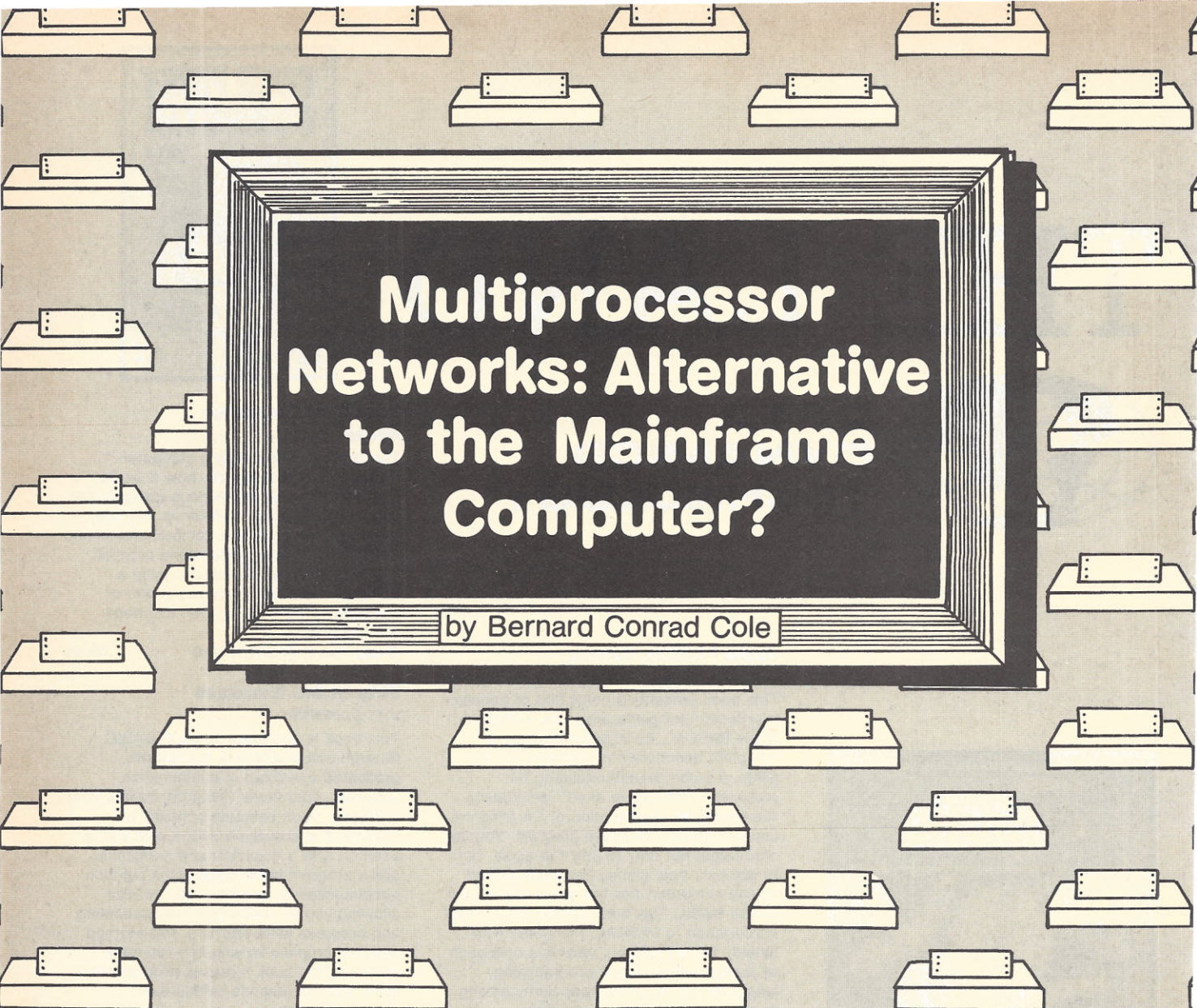
Exp. Date _____ Signature _____

*California residents add 6% sales tax. Availability and prices quoted subject to change without notice.

Please allow 6-8 weeks for delivery. You may photocopy this page if you wish to keep your INTERFACE AGE intact.

Orders cannot be shipped unless accompanied by payment, including shipping & handling and tax where applicable.

DATA DYNAMICS TECHNOLOGY, A Division of INTERFACE AGE Magazine (213) 926-9548



Multiprocessor Networks: Alternative to the Mainframe Computer?

by Bernard Conrad Cole

With the emergence of various local area networking schemes, it is already clear that numerous computers can be hooked together to share not only expensive peripherals, but also tasks previously requiring a mini-computer. Before too long, it should be possible to build networks of microcomputers that will be powerful enough to actually replace the so-called mainframe computers in many applications. The mainframe computers will not disappear. There are numerous problems that require the raw number crunching power of a mainframe, such as scientific and engineering applications.

However, most of the problems facing business users of mainframes are not of this type and could be performed by a network of small computers, each working on separate parts of a problem in parallel. This three-part series will survey the pros and cons of multiprocessor systems.

Cost, until recently, has been the major deterrent to such systems, since the collection of small computers necessary to equal the capability has been more expensive. However, microprocessor and memory technology has evolved to the point that the availability of low cost computing power presents an increasingly attractive alternative to mainframes for many computing tasks.

For such multiple microprocessor-based systems to adequately perform many of the functions now performed by uniprocessor-oriented mainframes, sufficient intelligence must exist in the personal computers being used at each node.

With the use of advanced microprocessors that can access up to 16M bytes of memory directly, small computers are now becoming available that can directly access all the memory in the local dispersed processing network, without interfacing to a mainframe CPU. In a typical business application requiring 50 nodes, each with 256K bytes of memory, the local network would have 12.8M bytes available, much within the capability of these processors.

Most of the present generation of personal computers—based on eight-bit processors such as the Z80, 8080, 6800 and 6504—are not adequate to serve as nodes in such multiprocessor networks. But such small systems as IBM's 8088-based Personal Computer and the 6800-based Apple III have the necessary computing power and memory capacity (256K bytes in most cases).

With small systems of sufficient power, there are a number of alternatives to present multiprocessor distributed processing schemes, where the architecture

and software is so structured that each node has access only to its own local memory. (If it requires additional memory, it has only recourse to the mainframe CPU.)

One alternative structure is a dispersed processing scheme, wherein intelligent nodes are configured so that they can draw on the memory resources of all the others. In this approach, even if a node has only "x" amount of RAM internally, it can draw on 2x, 3x or 10x, if required for some specific application. This can be done by configuring the system memory so that it is stacked in 2,3 or 10 blocks. This approach requires the development of new software to solve the problems of contention and the use of new CPU architectures capable of accessing several tens of megabytes of memory directly.

A possible compromise to these two alternatives is a multiprocessor scheme with common memory. In this approach, each node still has access only to its own local memory. But for additional external storage locally, one of the nodes has the additional function as the repository for extra memory. An ordinary intelligent node with soft disk capability can be adapted easily to hard disk to handle such a job.

Mainframe pros and cons

The advantages of working with existing mainframe CPUs are well known. Large software libraries are available and manpower may be more readily available. A mainframe's multi-programmed operating system allows shared computer usage. However, these advantages have to be weighed against a number of negative factors, which make mainframes an expensive approach in many applications.

Usually, a mainframe is designed for a variety of applications and is capable of supporting timesharing, batch operations and real time transactions concurrently. Operating systems must provide all these capabilities. Expensive hardware resources must be efficiently used, while at the same time protecting individual users. This creates a processing overhead that can be a particularly heavy load to bear in some applications. In addition, restart and recovery procedures have to be general enough to serve a large user base. A typical operating system may require 300K bytes of core storage, making the mainframe large and expensive, creating a mismatch between the computing power required and what is available.

Many computing problems are more demanding of file access than of CPU time. A large, powerful mainframe with large word sizes, fast CPU cycles and sophisticated instructions often represents overkill. A smaller, less expensive system with adequate files is often just as effective a solution—at a lower cost.

Many computer facilities consist of single expensive mainframes, since high cost prohibits the procurement of a second computer for backup. In this environment, jobs with high availability requirements suffer. For when the mainframe fails, the job remains idle until the CPU is fixed. A second reliability problem is the sheer complexity of the operating system. Few large operating systems and data base management systems are completely defect-free, so a large computer installation may crash more often due to software rather than hardware failures.

A centralized computing operation often is unresponsive to particular user needs. This may be caused by

such things as procedures that are designed to "globally" optimize the central facility, an overload facility or ineffective management.

Many mainframe CPUs have long or unpredictable response times for real time applications. This is usually caused by the overhead of the operating system and the data base management system, and contention for resources with other nonrelated users.

If care is taken in design, it appears that the multiprocessor approach, taking advantage of recent advances in semiconductor technology, can alleviate many of the problems incurred by mainframe uniprocessors.

Reliability is increased, since redundancy can be achieved in a relatively inexpensive manner. Unlike the mainframe approach, the entire system need not be duplicated—just those portions that meet the user's particular reliability requirements. In addition, simpler, more reliable software can be incorporated. A multiple microprocessor-based approach can also be more responsive, because the system can be closely tailored to a particular application. Additional processors can be provided, as needed, to ensure proper response time.

A properly-designed multiprocessor, moreover, when threatened by overload can be expanded incrementally at low cost by the simple addition of more processors. Such a system, because of its modularity, is much more cost-effective than a mainframe, because it can be configured to meet the needs of any type of environment—a small number of processors for a small site and a large number for a large site.

Although the concept of a multiprocessor is not new, the concept of implementing such a scheme using microprocessors is. In the 1960s, conventional, relatively expensive mainframe CPUs were linked, making it expensive to have more than a few processors. More recently, multiprocessors using minicomputers have been implemented, and configurations now exist with as many as 15 to 20 minis in a single computer system. Until the advent of low cost microprocessors, multiprocessor equivalents of mainframe and minicomputers using LSI modules were not built.

By mid-1975 there were, however, at least three companies working on such systems: Grumman Aerospace, using Intel's 3000 series of bit slice bipolar microprocessors; the now-defunct IMS Associates (Im sai); and a French firm, Realizations Etudes Electroniques (REE).

Grumman and REE based their systems on Intel's n-channel MOS 8080A microprocessor. In the Grumman approach, the aim was to interconnect as many as 10,000 microprocessor modules together to solve large problems that take many hours on a 370/168 mainframe. Initially, this scheme involved building one module and replicating it 10 or 20 times to improve performance two to three orders of magnitude (100 to 1,000 times) over the level of 370/168. The key to the potential high performance was that in each system, the individual microprocessors operated more or less independently on separate parts of a problem—or even on different problems.

In the REE approach, called the Micral-M, eight 8080s were interconnected with common memory. Using eight single board microcomputers based on the 8080A, the REE approach was supposed to be capable of handling 512,000 words of memory and performing three million instructions per second. Each processor

had its own local memory, but also shared part of a common memory, which held the program. Similarly, each processor was able to draw on the resources managed by another. The key to the system was a custom-designed schottky TTL LSI hardwired logic circuit that set the priority of access to the common memory, and resolved any simultaneous accesses of equal priority.

One of the most well-known attempts was made by the now defunct hobby computer maker, Imsai. Called the Hypercube, it was designed so that users could write distributed programs in low-level assembly language for each 8080A in the system. The basic operating unit is a subsystem consisting of two 8080A microprocessors, plus memory and interface circuits, mounted on a pair of pc boards. Each subsystem was located at a node of the Hypercube and connected to eight other subsystems in adjacent nodes. One of the 8080As executed the user program, while the other handled the overhead and communications tasks and the operating system software.

With the 8080A's direct memory access capability, one subsystem accessed another's memory, while the subsystem at the other node performed its own calculations. In use, some of the nodes were to be assigned the responsibility for processing input or output data, or interfacing with a printer, keyboard or disk storage unit and they would make data available to other nodes.

The Hypercube approach was configured so that users could program each node to perform its function, and the operating system built into each node would take over internodal communications. This was supposed to make programming not much more difficult than successive programming of single 8080As.

Each node in a Hypercube configuration was designed to have an instruction rate of 1 million instructions per second, a DMA capacity of 2M bytes per second and 16K bytes of user programmable memory, expandable to 64K bytes.

Hypercube exceeds many mainframes

This approach had the potential of performance that more than matched that of most mainframe CPUs. The simplest configuration—Hypercube II, consisting of 16 nodes—was designed to have an aggregate execution rate of 16 million instructions per second, a capacity of 256K bytes to 1.2M bytes of user program memory and the capacity to perform three million memory-to-memory additions per second. Comparable performance figures for the 81-node Hypercube III was projected to be 81 million instructions per second, 1 to 4M bytes of user program memory and 15 million additions per second; and 256 million instructions per second, 4 to 16M bytes of user program memory and 48 million additions per second for the 256-node Hypercube III.

Despite the advantages of multiprocessor systems as an alternative to mainframe uniprocessors, there have been few commercially viable systems constructed to date. Aside from the lack of sufficient computing power and local memory as well as cost, a number of problems remained to be resolved before they could become a practical alternative to more conventional organizations.

The limited address space of most present generation microprocessors such as the Z80, 8080, 8085 and 6800 requires the use of memory mapping to manage large physical memories. Mapping reduces a pro-

cessor's effective power by 5-20%, depending on the CPU and application.

Increased operating system overhead caused by interprocessor communications can reduce the effective power of the processor also. This overhead is a function of the number of messages transmitted between processors per unit of time, as well as the physical transfer method involved.

Multiprocessor systems are susceptible to defects when symptoms appear in one processor, even though the problem is really in another one altogether. The potential for this kind of problem increases with the tightness of the interprocessor coupling and the absence of interprocessor error checks. To correct interprocessor defects of this sort, a certain amount of message overhead may be necessary to isolate problems of the offending processor.

Several questions remain

Response time of a multiprocessor system can exceed requirements if the interprocessor communications facility doesn't provide adequate bandwidth for the message flow.

There are several important questions to consider. How should tasks now executed on uniprocessors be decomposed so that they can be run on a set of smaller processors? Can compilers or specialized run time systems be developed to do this decomposition automatically or must the programmer do the decomposition explicitly?

What are the most effective types of processor/memory and processor/processor interconnection structures, and what are the related communication protocols?

What mechanisms are appropriate for performing the virtual-to-physical address translation? These mechanisms should allow processors to share code and data, while ensuring adequate levels of protection and performance.

What software structures are suitable for large systems containing hundreds of interconnected microprocessors? Among the important problems in this area are resource management, software distribution, protection and reliability.

Even after tasks have been decomposed to run on multiple microprocessors, how should interprocessor interface and contention for memory and I/O resources be minimized?

With multiple microprocessors contending for resources, the potential exists for a situation wherein each of a group of processors is waiting for resources assigned to other processors in the group, and none of the processors is able to proceed until its demands are satisfied. This situation effectively disables all the processors involved and special care must be taken in the design to avoid it.

What hardware and software structures will allow a multi-microprocessor system to realize its potential for surviving failure of components in the system?

How should input and output devices in general, and secondary storage devices in particular, be integrated into a multi-microprocessor system?

Since the early 70s, an enormous amount of research has gone into answering these questions. Next month's article will discuss what researchers consider the most appropriate multi-microprocessor configuration. □

THE COMPLETE MAILING LABEL & FILING SYSTEM

ULTRA PLOT SUPERB BUSINESS GRAPHICS

AND THE INTERFACE BETWEEN THEM

(WITH FILE UTILITIES)

Also included, special disk:
**Introduction To File
Maintenance With Your
Apple Computer**
(Available Separately: \$10.00)

"The Friendliest System for Your Apple™"

Now you can use our **Complete Mailing Label & Filing System** for dynamic file maintenance: labels 1 to 4 across, duplicate labels, customized labels; elaborate multi-level COUNT/SORTs, range sorts and partial field sorts; Formatted 80-column (or more) reports. A friendly manual and straightforward disk menus make this system a breeze to learn and use.

Ultra Plot is beautiful business graphics, completely menu driven (with no commands to learn). Create Bar Charts, Stacked Bar Charts, Line Graphs, Filled Line Graphs, Scatter Charts, Pie Charts, Hi-Low Graphs, and (UNIQUE) Map Charts. Includes statistics. Data files or pictures may be saved to disk, edited, superimposed, etc.

The **Ultra Plot/Complete Mailing Label & Filing System Interface** allows you to use your mailing system data files to create Ultra Plot data or picture files. See all of your mailing system information in graph or chart form! This utility will total and average; search, sort, and count. Also includes utilities: merge, reformat, index any field, subfile creation based on any search/sort you want.

Your first step (and maybe your last) with your Apple Computer.

Requires Applesoft ROM, 48K, 1 or 2 Disk Drives, DOS 3.2 or 3.3, Muffinable. 8 Diskfuls, 5 part 3-ring manual \$175

VISA-MASTERCARD .

See it at your dealer

SMALL BUSINESS TRILOGY

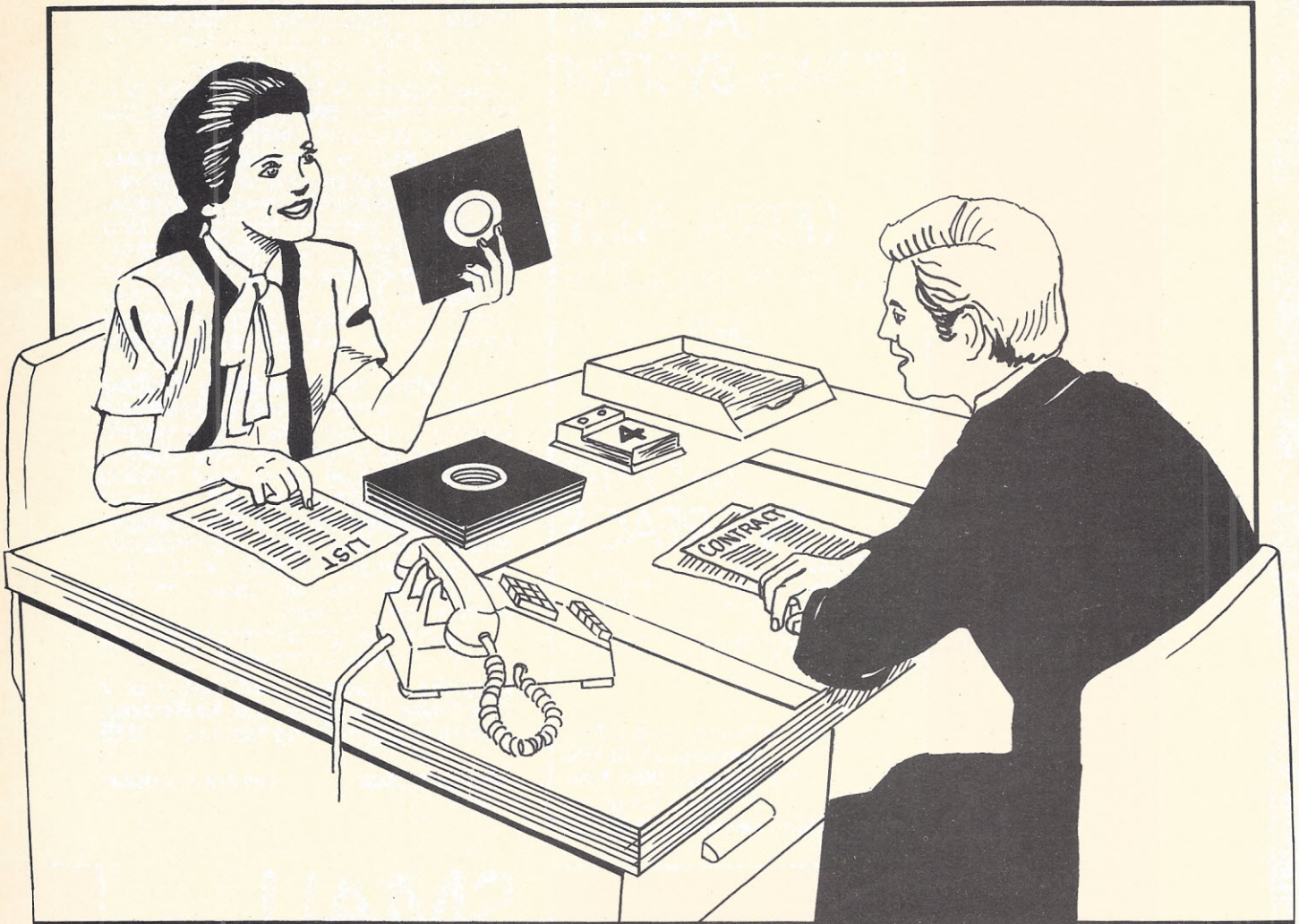


AVANT-GARDE CREATIONS
P.O. Box 30160
Eugene, OR 97403
(503) 345-3043

CIRCLE INQUIRY NO. 10

© Eric A. Martin '84

NEGOTIATING FOR YOUR SOFTWARE



by Reginald D. Gates

There are three ways you can obtain software for your business. You can buy an "off-the-shelf" package, you can write the programs yourself, or you can pay someone else to develop a customized system. This third alternative is expensive, but it can produce a quality system well suited to your needs. It can also produce a nightmare—a system that costs too much, that wasn't delivered on time, and that won't do what you want.

One way to avoid a nightmare is to negotiate an appropriate contract with the people who will develop the software for you. Usually you can depend on your lawyer in contract negotiations, but he may not be

knowledgeable in the area of computer software. Following is a list of points to be reviewed with both your attorney and the software people. Although certain approaches are suggested, other issues may come up and other solutions may be more appropriate than those given.

A contract for custom system development should be regarded as a "meeting of minds" about the work to be done. Avoid making the negotiations into a battle. There are some areas that can be compromised (and some that cannot), but the approach should be to develop mutually agreeable solutions to the problems.

Statement of Work is the most important part of the contract. Quite simply, it describes what is to be done. It should cover at least these three areas: (1) the function of the system to be developed; (2) the capacities

or limitations of that system, and (3) the hardware and software to be used.

When this section is developed, be as specific as possible—avoid sales phrases like “rapid response to management’s needs” and “readily adaptable to changing business situations.” If reports are to be produced, describe them and give samples. If existing documents will be used to provide input to the system, provide samples of these documents. Specify exactly what computer system and hardware will be used and what limitations will be inherent in the system. Give an overview of the flow of data through the system. Figure 1 shows a brief example of a Statement of Work for an accounts payable system.

Developing contract takes special abilities

Obviously, developing this portion of the contract takes a lot of work and some special abilities (accurately estimating disk file sizes, for example). One of the best approaches is to have the software people develop the statement based on interviews with you and your staff. You should expect to pay their regular time and material rate (which will be high), but only for the relatively short time necessary to produce a Statement of Work. This method has several advantages. You get to interact with the software people and find out if they are able to comprehend your business problems—if they can’t, don’t use their services. The statement can also be sent out for bid to several different vendors to find out how complete it is and ascertain the cost of the system. An additional benefit is the sample of the type of documentation that the software people can produce. This is quite important, since a system is only as good as its documentation.

Now that you’ve determined the task requirements, the next question is the price of the system. In some instances, the software vendor will give you a fixed price bid and you will need to know exactly what this covers. For example, if the proposed system requires a new printer, is its cost included in the bid, or did they bid software only? If both the hardware and software are rolled into the bid, you might consider asking them to break each item down separately so that you can see if it would be better for you to purchase the hardware yourself. If the vendor is bidding software only, exactly what equipment must you purchase?

Most vendors will want to bid the project on a time-and-material basis. In this case, you will need to know how the time is calculated—for example, is travel time included? If the work is to be done at the vendor’s site, you should discuss how the labor hours will be monitored and controlled by the vendor. If overtime is required to meet your schedule, will you pay the regular rate or an overtime rate? The contract should also contain a clause that will protect you from rate increases while the contract is in effect.

Suppose the system is to be developed on the vendor’s computer. Will you be charged for the use of his machine? If so, at what rate, and how will this expense be controlled?

Payment schedule and system acceptance present further complications. Basically, the vendor wants to be paid as the work is done, since that is the way he incurs his expenses. On the other hand, you don’t want to pay until the system is finished, so you can be sure that it performs to your satisfaction. A procedure to

determine that the system works must be established and documented in the contract so you will feel comfortable in paying.

Usually this procedure will call for some sort of system acceptance test. This means that the vendor will turn over the system to you, and that you must test

Magic Software, Inc. will design, program, test, and implement an accounts payable system for the Rapid Machine Works. The system will be written in Applesoft Basic and run under DOS 3.3 on an Apple II system with 48K of core. The system must have two 5¼ in. disk drives (minimum capacity 130,000 bytes each) and a printer capable of printing 110 columns in width, equipped with a tractor feed.

The following reports will be produced (samples are included as an attachment to this document).

Vendor List	Invoice Register
Open Invoices	Paid Invoices
Checks	Distribution Journal

The Vendor list can be produced in either vendor number or name sequence. The check report must use the existing check form used by Rapid Machine Works, as shown in the sample.

The system will be able to accommodate a maximum of 300 vendors at any one time. It will be able to produce a maximum of 600 checks a month, and the maximum amount of any one check will be \$99,999,999.99. The maximum balance for any vendor will also be \$99,999,999.99. Up to 300 invoices a month can be processed through the system.

A diagram of the data-flow through the system is attached to this document.

Figure 1. The Statement of Work

Upon completion of its testing, Magic Software will install the accounts payable system on the Apple II computer located in the Rapid Machine Works office and notify Rapid in writing that the system is ready for Acceptance Test. Rapid will have ten working days in which to test the system to its satisfaction. If an error occurs, Magic Software will correct the error at no cost to Rapid and the ten-day acceptance period will start over. If the acceptance test is completed prior to the ten-day period, Rapid will notify Magic Software in writing. If the ten-day period lapses without any notification to the contrary, the system will be considered to have been accepted.

Rapid Machine Works agrees to pay Magic Software for the development of the system on the following schedule: 50% of the total amount due at the beginning of acceptance test and the remaining amount due within 15 days after the successful completion of the Acceptance Test. Charges related to training will be paid within 15 days following the completion of training.

Figure 2. The System Acceptance Test

it in order to determine if it works or not. (For an accounts payable system, you might run your last month’s payables through the new system.) This will take time and effort on your part, but a good acceptance test will do a lot for building your confidence in the vendor’s work. An example of an acceptance test provision is shown in figure 2.

Once the vendor begins work and gets into the project, changes may have to be made in the Statement

of Work. There might have been some misunderstandings, or additional research may turn up holes in the design, or you might change your mind about what you wanted. In any case, there has to be a procedure that enables you to communicate these changes to the vendor and enables him to respond with any modifications in the cost or schedule for the system.

If there is a definite date when you need the system to be operational, this date should be clearly stated in the contract. What happens if the date is missed by the vendor—will there be a penalty assessed against him? This point needs to be specified.

A couple of interesting questions need to be answered in terms of ownership. First, who owns the finished software? May the vendor resell the system developed (and paid for) by you on the open market? If so, perhaps he should compensate you, either by royalties, or by reducing charges, since he will be gaining revenue from the system.

Here is another consideration. Suppose the contract states that the vendor owns the software and you open a new branch office for your business. Can you copy your existing software and install it in the new branch? Can you sell the software as an asset if you sell your business?

Vendor may modify package

The vendor may choose to purchase an existing package and modify it for your needs. You need to be certain that all the software supplied to you is legally his and that he has the right to sell it to you. Figure 3 gives an example of software ownership clauses that address these points.

If the system deals with sensitive areas of your business such as payroll or accounts payable, the contract should contain a clause preventing the vendor from disclosing this data to your competitors (and perhaps your employees). If you provide him with copies of your files (i.e., last month's payroll), the contract should be clear that this data is yours and must be returned when the contract is terminated.

If the work is to be done on your computer, how will the vendor have access to it? Will he be allowed to remove the machine, or will you let him into your office

after-hours? In the first case, what happens if the machine is stolen or damaged while in his care? In the second, what would happen if one of the vendor's employees injured himself while working in your office?

Since you will have to run the system after it has been accepted, the system must be documented and your staff must be trained. The extent and type of both

1. Magic software shall be the owners of the accounts payable system developed for the Rapid Machine Works and shall have the right to market it if Magic so chooses, provided that a royalty of 15% of the purchase price will be paid to Rapid for every accounts payable system sold. In the event that hardware is sold along with the software, the royalty will be computed on the price of the accounts payable software alone. If the system is included with other software, such as an integrated accounts payable and accounts receivable package, the royalty will be calculated based upon the usual price of the accounts payable package alone. In the event that Magic Software discounts the accounts payable package to a customer, the royalty will still be 15% of the full price.

Magic Software shall not sell this software or any software of which this system is a part to any other software vendor without prior written permission from Rapid Machine Works.

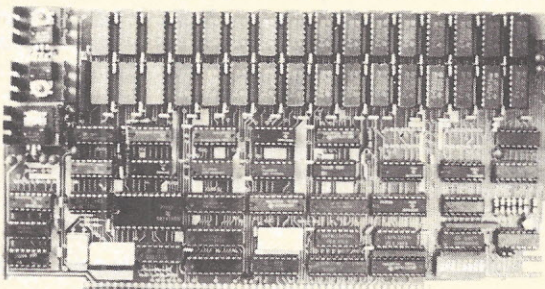
2. Magic Software holds that all of the software supplied with the system (with the exception of the Applesoft Basic) is its own and that Magic has the legal right to sell or provide this software to Rapid Machine Works. Magic Software will protect Rapid Machine Works against any claim that the software Magic has provided violates any licensing or copyright rights.

Figure 3. Ownership of the Software

documentation and training should be specified in the contract. You will need to agree on how the training will be done and how the vendor will be paid for his involvement in the training.

Reviewing all of these points and including them in the contract will benefit both you and the software vendor. You will be more certain that both parties are satisfied. □

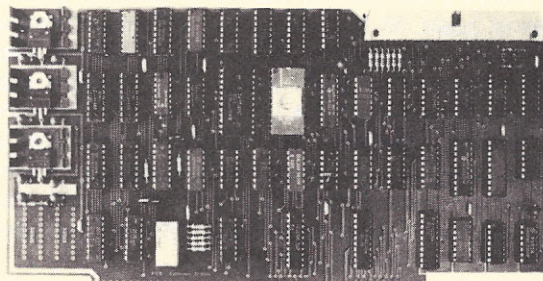
1/4 Megabyte RAM & 7.1 Megabit/Sec Disk



Bank Select RAM 64k To 256k

4MHz or 6MHz with no wait states - Invisible refresh
Uses or implements IEEE 696 S-100 extended address bus
Software selectable on any combination of 4k blocks
Multiple software selectable system masters
Includes MP/M* XIOS & solid state disk routines

Size	4MHz	6MHz
64k	\$ 770	\$ 795
128k	\$1015	\$1065
192k	\$1260	\$1335
256k	\$1495	\$1595



14" Winchester Fixed Disk Controller

Controls Shugart 4000 & 4100 series drives
Up to 174 megabytes per controller card
I/O mapped buffer - no wait states
Includes MP/M* XIOS & CBIOS

**Assembled
& tested \$895**

PCE SYSTEMS

Fine Products Since 1977

Price subject to change

5232 Manzanita Ave.

Carmichael Ca 95608

(916) 338-5454

*Trademark of Digital Research

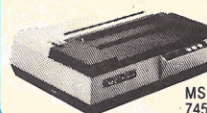
MICRO

BUSINESS WORLD INC.
Information Line (213) 996-2252
TOLL FREE MAIL ORDER LINES
(800) 423-5886 Outside Calif

TI-99/4
home computer

MSL 649.95

\$355.00
Save
294.95

NEC MODEL 8023A PRINTER

MSL 745.00

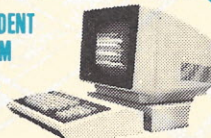
\$499.00
Save
246.00

SHARP BUSINESS COMPUTER 64K SYSTEM

- 5.25" diskette
- 284K byte per disk drive
- 2 disk drives per unit
- Expandable up to 4 units
- Including SHARP's FDOS (Floppy Disk Operating System)

Complete System Including Printer

MSL 5995.00
OUR PRICE \$3995.00
Save **\$2000.00**

NEC STUDENT SYSTEM 64K

- *NEC PC 8001 A Computer
- *NEC PC 8012 A Expansion
- *NEC PC 8031 A Dual Drive
- 12" Grn. Phs. Video Monitor

MSL 3565.00

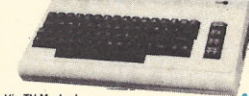
Save \$1170.00
OUR PRICE \$2395.00

**XEROX 820**

WORD PROCESSING SYSTEM (INCLUDES SOFTWARE)



MSL 3495.00
OUR PRICE \$2649.00
Save **\$846.00**

Commodore COLOR COMPUTER VIC-20

- Vic-TV Module \$19.00
- Vic Cassette \$69.00
- Vic Disk Drive \$ Call
- Vic 6 Pack program \$44.00

MSL 299.00
OUR PRICE \$255.00
Save **44.00**

HEWLETT PACKARD

	List	Our Price
HP-125 Microcomputer	3750.00	2750.00
HP-85 Microcomputer	2750.00	1995.00
HP-83 Microcomputer	2250.00	1777.00
16K Exp-Memory Module	295.00	255.00
Graphics Plotter 7225	2450.00	2075.00
Personality Mod. For 7225	750.00	665.00
2631B Impact/Printer		
Hvy Dty	3950.00	3250.00
Option 020 For 2631B	150.00	125.00
8 Drives to Choose		
From 82902S	1300.00	1125.00
9895A 8" Dual Drive	6850.00	5500.00
Graphics Tablet 9111A	2050.00	1678.00
HP-11C Slim-Line Advanced	135.00	119.00
HP-12C Slim-Line Financial	150.00	129.00
HP-41 CV New 2.2		
Bytes Mem	325.00	250.00
HP-41-C Calculator	250.00	185.00
Card Reader For 41CVC	215.00	162.00
Printer For 41CVC	385.00	289.00
Optical Ram For 41 CVC	125.00	97.00
Quad Ram Equals		
4 Mem. Mods	95.00	81.00
Memory Modules For 41C		
HP-97 Programmable Printer	750.00	595.00
HP-67 Programmable Calculator	375.00	295.00
HP-34C Programmable Scientific	150.00	117.00
HP-38C Programmable Bus. R/E	150.00	117.00
HP-32E Adv. Scientific	55.00	48.00
HP-37E Business Mgmt.	75.00	57.00

	List	Our Price
8032-32K 80 Col Crt	1495.00	1097.00
4032-32K 40 Col Crt	1295.00	989.00
4016-16K 40 Col Crt	995.00	788.00
8050-Dual Disk 950K	1795.00	1344.00
4040-Dual Disk 343K	1295.00	989.00
C2N-Cassette Drive	95.00	77.00
4022-80 Col Printer	795.00	639.00
8024-Mannings Talley	1995.00	1545.00
25CPS-Starwriter	1895.00	1399.00
CBM-IEEC Modem	279.00	225.00
Voice Synthesizer	395.00	325.00
VIC 20	299.00	255.00
PET to IEE Cable	39.95	34.00
IEEE to IEE Cable	49.95	39.00

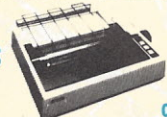
	List	Our Price
XEROX 820-1 5-1/4" Disk	2995.00	2399.00
Xerox 820-2 8" Disk	3795.00	2995.00
CP/M Operating System	200.00	169.00
Word Processing Software	500.00	429.00
Super Calc	295.00	249.00

ATARI PERSONAL COMPUTERS

	List	Our Price
400 16K Bytes of Ram	595.00	337.45
800 16K Bytes of Ram	995.00	699.00
410 Program Recorder	90.00	77.00
810 Disk Drive	600.00	457.00
825 Printer (80 Col Impact)		
Centronic 737	999.95	769.00
820 Printer (40 Col Impact)		
Centronic 737	450.00	353.00
830 Acoustic Modem	200.00	155.00
850 Interface Module	220.00	192.00
Atari Visicalc	200.00	164.00

TEXAS INSTRUMENTS

	List	Our Price
TI 99/4A Console New Improved	950.00	369.00
10" Color Monitor High Resolution	399.95	339.95
32K Memory Module	399.95	312.95
Speech Synthesizer	149.95	127.95
Disk Memory Drive	499.95	390.95
RF Modulator	49.95	42.50
Telephone Coupler (Modem)	224.95	185.95
Printer (Solid State)	399.95	315.95

PRINTERS

	List	Our Price
EPSON		
MX 80 FT	\$ 745.00	\$ 549.00
MX 80 IMPACT	645.00	447.00
MX 70 IMPACT	500.00	369.00
MX 100	995.00	725.00
ANADEx 9501	1650.00	1299.00
NEC		
5510	3195.00	2445.00
5515	3295.00	2545.00
3510	2495.00	1795.00
3515	2545.00	1849.00
OKIDATA		
MICROLINE 80	545.00	395.00
MICROLINE 82	649.00	549.00
MICROLINE 83	1050.00	769.00
PAPER TIGER		
445G with Graphics	795.00	695.00
460G with Graphics	1,394.00	899.00
560G New full size	1,695.00	1,139.00
DIABLO (LETTER QUALITY)		
630 R102 bi-directional tractors	2,965.00	2,450.00
1640K109 keyboard		
630 R0 Receive Only	4,000.00	2,899.00
1650K 136 keyboard tractors	2,710.00	2,250.00
	4,000.00	3,100.00

MONITORS

	List	Our Price
BMC		
12" Grn. Phs KQ (15 Hz)	219.00	165.00
12" Grn. Phs EO (18 Hz)	\$249.00	185.00
12" Grn Phs (20 Hz)	279.00	209.00
12" Colour Composite Hi Res.	439.00	319.00
Grn. Phs 12"	275.00	165.00
NEC Grn. Phs. 12"	225.00	179.00
Zenith 12"	159.00	119.00

LE MONITOR

- 9" B & W 179.00 159.00
- 9" Green Phs 189.00 165.00
- 12" B & W 209.00 185.00
- 12" Green Phs. 229.00 199.00
- 12" Green Phs. 199.00 159.00
- Anti Reflective Screen
- T.V. Grade Screen

SANYO MONITORS

	List	Our Price
13" Color (new) high quality	\$550.00	399.00
12" Green Phs.	360.00	269.00
12" B & W	340.00	239.00
15" B & W	370.00	255.00
9" B & W The Best Seller!	235.00	159.00
9" Green Phs.	275.00	199.00

1 Year Extended WARRANTY

\$99.00
INQUIRE

AVINGS SERVICE ELECTION ATISFACTION

TERMINALS TELEVIDEO

	List	Our Price
910	\$ 699.00	\$ 599.00
912C	950.00	699.00
920C	995.00	795.00
950C	1,195.00	949.00

DISKETTES SOLD IN BOXES OF 10 (Min. Purchase) \$100

	List	Our Price
DYLAN		
104/1 5" SOFT SECTOR	6.00	3.99
104/1D = " DBL.		
DEN-SOFT SEC.	6.40	4.60
3740/1 8" SOFT SECTOR	7.25	4.75
3740/1D 8" DBL.		
DEN-SOFT SECTOR	10.75	6.90
MAXELL		
MD-1 5" SOFT SEC-TOR/DBL. DEN.	5.00	3.88
MD-2 " SOFT SECTOR/DBL. SIDE/DBL. DEN.		
FD-1 8" SOFT SEC./DBL. DEN.	7.00	4.90
DEN.		
FD-1 8" SOFT SEC./DBL. SIDE/DBL. DEN.	6.50	4.50
DEN.		
FD-1 8" SOFT SEC./DBL. SIDE/DBL. DEN.	8.50	5.95

DRIVES

	List	Our Price
CORVUS		
5 MBYTES	3,750.00	\$3,050.00
10 MBYTES	5,350.00	4,449.00
20 MBYTES	6,450.00	5,325.00

EXPANSION BOARD

	List	Our Price
Q STAR		
16K RAM BOARD	199.00	129.00

SOFTWARE

	List	Our Price
Language System with Apple Pascal	495.00	399.00
BPI General Ledger System	395.00	319.00
Visidex	200.00	159.00
Visicalc	200.00	159.00
Desktop Plan II	200.00	159.00
MicroLab Database System	150.00	119.00
Stoneware DB Master	229.00	189.00
Muse SuperText II	150.00	119.00
Softpage Magic Window	99.00	72.00

SOFTWARE

	List	Our Price
FOR COMMODORE		
Ozz-The Information Wizard	395.00	\$289.00
Wordcraft 80	395.00	289.00
Imme-Info Retrieval & Mgmt. Aid	495.00	389.00
Dow Jones Portfolio Mgmt.	149.00	119.00
Pascal Development Pkg.	295.00	219.00
Ebs-Receivables, Inventory	750.00	569.00
Bpi-General Ledger	395.00	389.00
Word Pro 3-40 Column	250.00	175.00
Word Pro 4-80 Column	375.00	259.00
Word Pro 4 Plus	450.00	319.00

MODEMS

	List	Our Price
NOVATION CAT MODEM	189.95	140.00
NOVATION D-CAT	199.00	150.00
NOVATION APPLE-CAT	389.00	329.00
HAYES MICROMODEM	379.00	295.00
HAYES SMARTMODEM	279.00	239.00

CALCULATORS

	List	Our Price
CASIO		
HR-10 Paper Feed	49.95	39.00
HR-12 Paper Feed	54.95	42.00
FR-100 Paper Feed	79.95	59.00
FR-1210 Paper Feed	129.95	99.00
PQ-20	29.95	23.00
LC-785	12.95	10.00
LC-3165	12.95	10.00
FX-68 Scientific	29.95	23.00
FX-81 Scientific	19.95	17.00
FX-3600P Scientific	39.95	29.95
FX-602P "Computer Talk" 88 Memories Pro		
gramming Upper & Lower Case Dots		
Matrix 512 Step	129.95	99.00
FX-702P Solves Problems with Alpha-Numeric Clarity, uses Basic Language	199.95	159.00

TELE. ANSW. DEVICES

	List	Our Price
PHONE MATE		
900 Economy	119.95	86.00
905 Remote Dual Tape Sys.	199.95	144.00
910 60 Calls Per Side	159.95	115.00
920-C Vox	199.95	144.00
925 Remote Call Monitor	239.95	173.00
930 Remote Twin Cass.	299.95	216.00
950 Remote	339.95	245.00
960 Remote Built In Tele. Microcomputer Controlled	399.95	288.00

MICRO BUSINESS WORLD MAIL ORDER WAREHOUSE

16720 Oxnard, #108 Tarzana, CA 91356

Tel: 182852 Answer: MICRO T2NA

OUTSIDE CA CALL TOLL FREE 1 (800) 423-5886 IN CA (213) 996-2252

Name (Please print) _____

Address _____

City _____ State _____ Zip _____

Qty Make Model Description Price Total

☐ Certified Check or M.O. ☐ Allow 2 weeks clearance for personal check

☐ Bank Wire Transfer ☐ personal check

CREDIT CARD # _____ Signature _____

Exo. Date _____

TOTAL ORDER \$

TAX IF APPLICABLE*

SHIPPING & HANDLING**

TOTAL ENCLOSED \$

☐ VISA ☐ MasterCard

☐ VISA ☐ MasterCard

☐ VISA ☐ MasterCard

☐ VISA ☐ MasterCard

☐ VISA ☐ MasterCard

☐ VISA ☐ MasterCard

☐ VISA ☐ MasterCard

☐ VISA ☐ MasterCard

☐ VISA ☐ MasterCard

☐ VISA ☐ MasterCard

☐ VISA ☐ MasterCard

☐ VISA ☐ MasterCard

☐ VISA ☐ MasterCard



WHERE TO BUY YOUR SOFTWARE

by Louis E. Frenzel, Jr.

It used to be that the biggest problem with owning a microcomputer was that there was little or no software available. In the mid-70s when micros first appeared, about the *only* thing you could buy was hardware. If you had a Basic interpreter, a monitor in ROM, or an editor/assembler, you had just about all the software that was available. If you wanted specific applications programs, you had to write them yourself.

Now all this has changed. There are all sorts of software available for dozens of different kinds of microcomputers. Not only are there many different kinds of systems software packages and languages, but also there are thousands of applications programs available to make the microcomputer useful. Software for business, accounting, finance, science, engineering, and education is readily available for the most popular machines. In fact, there is so much software available that the main problem is deciding the best place to buy among several good choices. What a

terrific problem to have! Following is a rundown of the alternatives available to the software shopper.

The computer stores

Since the greatest percentage of software for microcomputers is sold through computer stores, these should be your first target. If you are going to find the best piece of software for your application, you are going to have to shop around. Don't go to just one or two stores near your home; visit as many in your area as possible. Go to ask questions and learn. Prepare a concise list of your exact application needs, then ask the salesman if he knows of any software that will fill the bill. Ask about alternative sources and try to find out which piece of software is the most recommended. Look through all of the software available in the stores. Get sales brochures if they are available. If the documentation and manuals are available, take the time to review them. Ask what other customers are using to perform similar applications.

If you survey enough computer stores, you will eventually begin to see some patterns emerge. Assuming software is available for your application, you will begin to hear a number of stores repeating the names of the applicable software packages. You may also get a hint

as to what the most popular or highly regarded package is. It is possible that you may discover that there isn't any specific software available for your application. If this is the case, you will need to have your software custom-designed. (See article on page 118.)

Your survey of computer stores should also include the new software shops that are appearing around the country. The latest trend is retail stores that specialize only in microcomputer software. Typical of such outlets is the Software Store chain in the Los Angeles, CA, area. Even Computerland, the largest retail computer store chain, is trying out this idea by opening a number of satellite software stores.

On the East Coast, a number of software-only retail centers have opened. The largest is a new chain called Programs Unlimited Computer Centers with stores on Long Island and in White Plains, NY. Other outlets are planned for New York and New Jersey locations. The Microcon Software Centers are another East Coast chain of software-only stores. Specializing primarily in business applications software, Microcon stocks thousands of different software packages. The Program Store chain in the Washington, D.C./Maryland/Northern Virginia area is another example of a successful software outlet. Check your area for software specialty stores, as they are sure to be one of your best program sources.

The manufacturers

While most of the microcomputer manufacturers specialize in hardware, many also supply a considerable amount of software. Apple, Radio Shack, Heath/Zenith, Commodore, IBM and others sell not only systems software and languages, but also many applications programs as well. A good starting point for your software search is to go directly to the manufacturer of your computer.

Try to get a copy of the latest software catalog from the manufacturer. These catalogs date quickly, so try to get the most recent edition and get on the mailing list for updates.

Also check into the existence of users' groups. Many manufacturers sponsor organizations of customers whose purpose is to exchange information on their systems and applications. Many users groups solicit and sell software and publish newsletters and magazines that regularly give information about the availability of software packages and other accessories for a given machine.

A number of microcomputer manufacturers also have customer hotlines. I recently witnessed the operation of such a line at Commodore. Customers can call and get first hand information on the software packages available for their Commodore systems. It's a feature other manufacturers should have. Most manufacturers do have some kind of an 800 number or information telephone line, so take advantage of it. Ask your local store for the number if you don't have it.

The magazines

One of the best sources of information on software are the various microcomputer publications. There are literally dozens of these and all of them cover software regularly.

Software coverage in the publications comes in three different forms: ads, articles and reviews. The

ads are the best source of information about basic software packages. Pick up two or three popular computer magazines the next time you are at the computer store, or order subscriptions. There are literally hundreds of software ads in most magazines. Note the ones of interest to you and write for additional information.

Most magazines also regularly feature software articles. A high percentage of these cover specific software packages. Some of the best articles are those that compare and contrast similar software packages. In recent magazines, I've seen comparison articles on word processing packages and data base management systems, for example. Many of the microcomputer publications also regularly publish software reviews, wherein specific packages are evaluated and critiqued.

Mail order firms

There are several large mail order distributors with whom you should check before buying software. One of the largest is Lifeboat Assoc., New York, NY. This company publishes an enormous software catalog and features software for CP/M-based machines. You will spot Lifeboat ads in most of the microcomputer publications. There are numerous other large mail order software distributors. All of them will send you a catalog. Look for them as you scan the magazines.

You will also discover that one of the main benefits of buying by mail order is discount prices. Since mail order firms do not have the overhead of a retail store, they can often sell the software below the suggested retail list price. The big disadvantage, however, is service, or lack thereof. While the larger mail order distributors do offer

FREEDOM TECHNOLOGY INTERNATIONAL, INC.

Freedom Technology International, Inc., the international computer enhancement distributor and developer, is pleased to announce that it has obtained the world wide distribution rights for the Freedom Option hardware enhancements and the powerful operating system T8/OS which were developed by Field Engineering Consultants, LTD.

These exciting microcomputer enhancement packages permit the use of CP/M* program applications on TRS-80* Model I and Model III, PMC 80 and PMC 81* and LNW 80* systems.

Also available for the Model I and the Model III are the Freedom Plus Options which expand 48K systems to 64K RAM.

For further information on how to order please write:

FREEDOM TECHNOLOGY INTERNATIONAL, INC.

119 N. 18th Street, Philadelphia, PA 19103

or call:

(215) 569-2381

Watch for our display ad in the next issue of Interface Age.

Dealer inquiries invited.

*C P/M is a trademark of Digital Research
TRS-80 Model I and Model III are trademarks of Radio Shack/Tandy Corp.
PMC 80 and PMC 81 are trademarks of Personal Micro Computers, Inc.
LNW 80 is a trademark of LNW Research Corporation.

service by telephone, others do not. If you suspect that you may need help with your software, try to purchase it from a local store. They will be able to provide the hand-holding assistance you may need.

The directories

There is so much software now available for microcomputers that a number of publishers have begun to catalog it. Today there are a number of good microcomputer software directories available. These directories can be an excellent resource. As you might imagine, they are virtually out of date the minute they are published. However, the better directories are revised frequently. Some are quite expensive, so it might be worthwhile to try to borrow one rather than buy it. But others are reasonably priced. They are a modest investment to help you find a good piece of software.

The International Microcomputer Software Directory offers over 5,000 programs cross-referenced by application, machine, operating system and vendor. Quarterly updates are provided. Price: \$29.95. Order from: Imprint, 420 South Howes, Fort Collins, CO 80521.

Directory of Microcomputer Software is a two-volume loose leaf directory, covering over 2,000 programs by over 1,000 companies. They are indexed alphabetically, geographically, by application and by product name, including acronyms. Monthly updates, a monthly newsletter and a telephone inquiry service are included. Price: \$340. Order from: Datapro/McGraw-Hill, 1805 Underwood Blvd., Delran, NJ 08075.

Software Vendor Directory catalogs both systems and applications software from 1,500 software companies

and 91 hardware manufacturers in 250 categories. Over 9,000 programs are listed. Two updates per year are offered. Price: \$100; (\$200 in diskette version). Order from: Micro-Serve, P.O. Box 482, Nyack, NY 10960.

Dataguide is a master catalog and directory of OEM computer products. It covers hardware and accessories as well as software. It is published twice yearly. Price: \$50. Order from: Sentry Database Publishing, 5 Kane Industrial Dr., Hudson, MA 01749.

The Apple Software Directory includes thousands of programs categorized by business, games and education subjects. Price: \$19.95. Order from: WIDL Video, 5245 W. Diversey Avenue, Chicago, IL 60639.

Commodore Software Encyclopedia catalogs all the software for the popular Commodore Pet and CBM line of computers in all categories. Price: \$4.95. It is available at Commodore dealers, or write: Commodore Business Machines, Computer Systems Div., 300 Valley Forge Sq., 681 Moore Rd., King of Prussia, PA 19046.

Software Directory lists over 150 CBasic (Compiler Systems) programs available from vertical market suppliers. It includes accounts payable, retail distribution, word processing and others. Price: \$14.95. Order from: Digital Research, P.O. Box 579, Pacific Grove, CA 93950.

TRS-80 Applications Software Sourcebook (#26-2114) features over 2,300 programs for the models I, II and III indexed by application. Price: \$2.95. It is available at Radio Shack stores. □

Give Your TRS-80* a Tremendous Boost with RACET COMPUTES Software

RACET COMPUTES Utility Software makes the TRS faster, more efficient, and easier to use. Our programming aids improve your productivity. Our reputation is for products that are professional in design and work as advertised!!!

FIELD PROVEN HARD DISK DRIVES AND OPERATING SYSTEM

Now you can use RACET's Hard/Soft Disk Operating System (HSDS) with the ARM Winchester Disk Drive on the Model II. This cost effective combination provides 15 Megabytes per drive including ECC Error Correction Code and an advanced sequencer to further ensure data integrity. An incremental backup to floppy is provided so that only those sectors that were changed from the last backup are saved. A full monthly service contract is available at \$30 per month per drive.

The HSDS Software has more than One Year's FIELD Experience. The latest HSDS version adds several enhancements including maintenance of system files on the hard drive, files as large as the disk, the ability to segment the disk as logical drives, definable directory size, and many utilities including bulk copies between floppy and hard drives, multiple purge, Superzap, and Directory Catalog System. Full program compatibility with TRSDOS 2.0a is maintained. Mixed floppy and hard drive operation is supported.

HSDS is available for the Cameo, Cynthia Bull, Corvus, Data Peripherals, and Santa Clara Systems hard disk systems as well as the ARM Winchester Drive.

ARM 15 Megabyte Drive Subsystem \$3895. HSDS Software \$400.
Cameo 5/5 Cartridge Drive \$5995. Cynthia Bull 10/10 Drive \$7995

NEW PRODUCT ★ Model II Fast Backup Utility ★ \$75

5 to 10 times faster backups!!! Full disk backup (including verify) 55 seconds!!! on two drive system — 2:15 on single drive system. In business, time is money, and one BACKUP is worth 1000 tears!!!

NEW PRODUCT ★ INTEGRATED BUSINESS SYSTEM ★

ISAM File Structure — Multi-Company Capability. Modular structure. Each module includes complete user documentation which guides the user through installation and allows "practice" using a sample data base. When ready, the user simply names his data base and begins. The Integrated Business System program set includes General Ledger, Accounts Receivable, Accounts Payable, Payroll, Inventory, General Journal, Asset Management and more.

Business Programs \$250/module Mod III, \$300/module Mod II, \$795 for all four Mod III, \$995 for all four Mod II. General Ledger and Accounts Receivable available now. Accounts Payable and Payroll 1st Quarter 1982.

RACET COMPUTES LTD.
1330 N. GLASSELL, SUITE M, ORANGE, CA 92667

CIRCLE READER RESPONSE BELOW FOR FREE CATALOG

CHECK, VISA, M/C, C.O.D., PURCHASE ORDER
TELEPHONE ORDERS ACCEPTED (714) 997-4950

*TRS-80 IS A REGISTERED TRADEMARK OF TANDY CORPORATION

GET THE MOST FROM YOUR NEC PC-8001 WITH RACET COMPUTES SOFTWARE!!

RACET NECDOS \$175

RACET NECDOS does more for your PC-8001 than any other DOS. It's faster, more efficient and easier to use. It's loaded with extra features to let you stretch the limits of your system. This advanced operating system works with the ROM NBASIC to give full compatibility with color and other BASIC commands.

USER FRIENDLY — Emphasizes Integrity. No MOUNT or REMOVE commands!!! Excellent protection from improper diskette swapping. AGAIN, HELP, FIND and REF commands. File password protection.

ADVANCED DESIGN. RACET NECDOS utilizes the computer in the 8031 for most disk I/O functions minimizing memory utilization in the PC-8001. The Dynamic Transient Area (DTA) allows multiple transients to be scatter loaded and relocated in memory simultaneously. This unique capability optimizes use of valuable memory, yet provides an almost limitless growth potential.

ADVANCED FEATURES. All DOS functions and commands may be used directly in a BASIC program!!! Special RUN option allows merging of programs, retaining all variables in memory. Fixed block spanned records: AUTO and DO commands. Machine language loads and saves. MATPRINT and MATINPUT to disk. Complete directory. ALL supervisory calls documented and available to the machine language programmer. Superzap utility included.

CONVERT TRS-80* PROGRAMS TO RACET NECDOS WITH 'PROTRAN' \$99.95

COMPLETE utilities for file transfer and BASIC program conversion. Model III diskettes may be read directly. Model I and II via RS-232. Transfer BASIC programs, data files, or machine language files. NO support is provided for conversion of machine language files or PEEK's, POKE's, or USR's to function on PC-8001. Includes Mod I, Mod II and RACET NECDOS Datadisk with complete documentation on conversion requirements and syntax differences.

MULTI-KEY SORT 'MKS' \$60

SUPER FAST Machine Language In-Memory Sorts. Three-key sort on 500 elements in 4 Seconds!!! Simple one-line BASIC functions — SORTV and SORTC verbs. Mixed ascending and descending keys.

KFS-80 KEYED FILE SYSTEM \$150

Machine language BASIC ISAM utility provides keyed and sequential access to multiple files. Simple interface to BASIC. Binary tree keyed-file index system provides rapid access to records.

RACET COMPUTES software for the NEC is distributed by the Waybern Corporation and is available from your local NEC Dealer.

Waybern Corporation

13911 Enterprise Dr., Garden Grove, CA 92643
(714) 554-4520 • (213) 222-7514

RACET COMPUTES LTD.
1330 N. GLASSELL, SUITE M, ORANGE, CA 92667

CIRCLE READER RESPONSE BELOW FOR FREE CATALOG

Associate
States and foreign countries
proprietorship for worldwide distribution
promotion of the aforementioned computer program
by Lifeboat Associates as exclusive marketing agent.

Author's Name _____



Lifeboat Associates
1651 Third Avenue, New York, N.Y.

AS AN AUTHOR THIS MIGHT BE YOUR MOST IMPORTANT LINE.

If you've tried to market your own program, you've probably run into a virtual brick wall of problems. Problems that require time, energy, funds, personnel and expertise to solve.

Lifeboat Associates invites you to bring your problems to us. That way you can do what you do best: create quality software. And we can do what we do best: sell it.

As an international publisher of quality computer software with a strong relationship among business, professional, programming and personal computer users, as well as micro- and minicomputer OEM's, Lifeboat Associates has sold and fully supported more software programs by more authors for more machines to more users in more countries than anyone else.

And we do a lot more than sell. Lifeboat also provides:

- Full after sales support • A multitude of media formats • OEM sales • Extensive promotional campaigns through Lifeboat's *Software Desk Reference*™, specially designed OEM private label catalogs, foreign catalogs, brochures, flyers and direct mail • Advertising • Advertising preparation • Marketing services throughout a wide network of affiliates, dealers and distributors • Translation facilities into foreign languages • Seminars • Typesetting services • And lots more

So if you've expended your time and genius in writing a great program, bring it to Lifeboat. We'll expend our time and genius in publishing it.

Write for a copy of the *Lifeboat Author Guide*.

1

Lifeboat Associates

World's foremost software source

1651 Third Avenue, New York, New York 10028

Copyright ©1981, by Lifeboat Associates Software Desk Reference is a trademark of Lifeboat Associates.

2217

Sorcim's SuperCalc

A VisiCalc-Like Program for CP/M

by Alan R. Miller

Pascal/M is a programming language developed over the past several years by Sorcim, San Jose, CA. (See IA Jan 82.) Now Sorcim is offering an applications program called SuperCalc that is similar to VisiCalc (IA May 80 and Aug 81). Both products can be used for complicated tasks, such as analyzing business transactions or predicting trends. They can also be used for simpler jobs such as balancing a checkbook. VisiCalc, which has been available for several years, runs on computers such as the Apple, TRS-80, Atari, Pet, and the IBM Personal Computer. However, unlike SuperCalc, there is no CP/M version.

SuperCalc uses direct cursor addressing. As a consequence, it may be necessary to configure your copy by initially running a separate program called Install. Of course, this only has to be done once. There is a list of over 50 different commercial video terminals to choose from. SuperCalc can also be tailored for the printer at this time (e.g., an 80-character line or 132-character line).

The rather detailed user's manual contains over 100 pages. It is unusually well written and set in high-quality type. There is a table of contents, but no index. The manual is assembled into a ring binder so that the pages lie flat when in use. The manual begins with an introduction and overview of SuperCalc. It then continues with a series of hands-on lessons using sample files provided on the disk. A summary of all commands and a glossary of computer terms are also provided. A separate reference card can be used to readily find the details of particular features.

When the initialized SuperCalc is started up, the user is offered a summary of the commands. However, this step can be bypassed if desired. The next step is to load a work file that was saved from a previous session, or create a work area directly on the screen. Help can be obtained at any point by typing a question mark. The SuperCalc direct commands are given by a slash followed by a single letter. When the user types the slash and the initial letter, SuperCalc immediately finishes spelling the rest of the word. For example, a file is loaded by typing the command /L and SuperCalc fills out the word to /Load. If a /D is entered, SuperCalc displays /Delete.

The information can be visualized as a table or matrix of values. Information in the table is located in cells that are referenced by a column letter and a row number. For example, the cell at the upper left corner is

designated as A1 and the cell that occupies the second column and the third row is referred to as cell B3. Notice that this terminology is reversed from the usual mathematical reference in which the row index is given before the column index.

Cells may contain a numeric value, a string of alphabetic and numeric (alphanumeric) characters, or a formula. There is a cursor designating the current cell, the one that can be altered. The cursor can be moved by the regular keyboard cursor arrows, in addition to the Control-D, X, S, E combination adapted by WordStar. The coordinates of the current cell are given at the bottom of the screen.

After a value has been entered into the current cell, the cursor moves to the next cell. The direction of motion is the same as for the previous entry and is indicated on the bottom of the screen. Thus, if a column of figures is to be entered in cells B2 through B5, the cursor could be placed in cell B1, then moved downward to B2. Each succeeding entry moves the cursor down one cell. On the other hand, the active cell can be directly changed to any location by entering an equals sign and the coordinate of the desired cell. For example, typing =K9 moves the cursor to cell K9.

Some cells in a column might contain numbers, while others contain characters. Suppose that cells B2 through B5 contain a list of numbers to be added. The cell directly below the last number (B6) can contain a dashed line. The cell directly below that (B7) will then contain the formula:

SUM(B2:B5)

indicating that the sum of columns B2 through B5 belongs here. The user actually types this command. However, the screen will display the resulting sum. For example, the screen might look like this:

12.35	(cell B2)
9.95	(cell B3)
15.67	(cell B4)
8.56	(cell B5)
----	(cell B6)
46.53	(cell B7)

Suppose further that a 4% sales tax is to be added to the above total. Then cell B8 could contain the formula 0.04*B7. Cell B9 could contain another dashed

line and cell B10 could calculate the grand total with the formula $1.04 \times B7$ or $B7 + B8$. If any of the values in cells B2 through B5 are changed, the results displayed in cells B7, B8, and B10 will automatically change to reflect the current values. The status line at the bottom of the screen always displays the originally entered data for the current cell, even though the calculated result is usually displayed in the current cell. However, there is a command to change the video screen so that the originally entered data is displayed rather than the results.

Altering the contents of a cell is very easy. There is a command to copy the contents of a current cell into the command line. The cursor-movement keys can then be used to overwrite, delete, or insert characters. Individual cells or groups of cells can be moved or replicated into other regions of the table. If a row or column of cells is eliminated, all the remaining cells move up or over to fill in the void. Of course, the coordinates of these moved cells are changed, and any formulas that make reference to these moved cells are also automatically changed.

The top row (row 1) and the left column (column A) will usually contain alphanumeric information describing the remaining cells. The width of each row and column can be individually selected as appropriate. Consequently, Column A can be set at 20 spaces to fully describe the corresponding row. Only a limited amount of information can be displayed on the usual video terminal at any one time. Yet SuperCalc allows up to 63 columns (A-Z, AA-AZ, BA-BK) and up to 254 rows (1-254). Consequently, the information in the table can be scrolled vertically and horizontally on the screen so that all of the information can be viewed.

There are several interesting features that make it easy to alter values throughout the table. The first row or the first column can be locked into place, so that heading information is always displayed on the video screen. For example, if the top row is locked and the table is scrolled vertically upward to row 30, the top row is always visible at the top of the screen.

Screen can be divided

Another nice feature is split-screen mode; this option allows two different portions of the screen to be seen at one time. The left half of the screen can be separated from the right section. By this means, the upper-left section of the table can be displayed on the left side of the screen and the lower-right section can be shown on the right half of the screen. Each can be independently scrolled. A command of a semicolon is given to move the cursor from one side of the screen to the other.

It is also possible to synchronize the two halves of the split screen. Suppose that the left side shows the upper-left section of the table (say January, February and March sales) and the right half shows the upper-right section of the table (say October, November and December sales). (The middle section of the table would not be shown in this case.) The two halves of the screen can now be locked together, and both can be vertically scrolled. By this means, the first three months' sales can be compared to the last three.

Yet another possibility is to display the identical cells on both the left half and the right half of the screen, but with different formats. The cells on the left side could display the numeric values of the data, while the cells on the right could display the corresponding formulas.

PASCAL

Announcing JRT PASCAL Version 2.

As the name implies, it's PASCAL refined — the second generation. Here's why:

- No limit on program size — separately compiled external procedures are auto-loaded
- No limits of size of procedures, nesting levels or recursion
- 14 digit precision arithmetic, no conversion errors, exponents from -64 to +63
- Dynamic strings up to 64K bytes
- Verbal error messages, dynamic trace, assembly code
- True dynamic storage with auto-compression
- All new 110 page user manual
- One-step compiler for CP/M* systems

If you're considering any PASCAL, seriously consider JRT PASCAL Version 2 before you buy.

Another advanced programming product from JRT Systems, it's ready for you now.

\$295 Order from:
JRT SYSTEMS

Dept. 2b
P.O. Box 22365, 1891-23rd Avenue
San Francisco, CA 94122

*CP/M is a trademark of Digital Research

CIRCLE INQUIRY NO. 51

The user has complete control over the displayed form of the data. It is possible to select integer, general, exponential (scientific), or dollar format. SuperCalc uses 14 digits of precision. Alphanumeric data can be right-justified or left-justified. These formats can be selected globally (over the entire display), for each individual cell, or for a particular column or row. Data can also be displayed in graphic mode. In this case, the information is displayed as a histogram of asterisks.

At any point, the current state of the table can be saved as a disk file. Thus, at a later date, it can be reloaded and changed. Of course, the final version can be printed on the list device.

The arithmetic functions include SUM, AVERAGE, MIN, MAX, INT, ABS, SIN, COS, TAN, ASIN, ATAN, EXP, SQRT, LN, LOG10 and PI. There are also conditional expressions. These are used to display one result if another cell or group of cells has a certain value, or to display a different result otherwise. Conditional expressions are formed with IF, OR, AND, and NOT. The formulas can include the operations of addition, subtraction, multiplication, division and raising to a power. There are also the usual logical operations such as less than, greater than, equals, etc. Thus a cell could be set up to display one value for a positive balance and a different value for a negative balance.

SuperCalc is a super program. Anyone can readily learn how to use it. Programming ability is not necessary, but possession of a computer with CP/M is. The program is written in the grand style of Microsoft Basic, Spellguard, and MicroPro's WordStar. □

NEW PRODUCTS

Programmable color computer, Commodore Ultimax, is easily connected to any color TV set. It features a flat membrane keyboard, programming in Basic, and uses both cartridges and cassettes for games, programming and music synthesis. It is compatible with joysticks, paddles and light pens. It uses the VIC Datasette tape recorder for program storage, and serves as a sound generator for polyphonic tones and for music synthesis. Price: \$150. Commodore Business Machines, Computer Systems

Div., 681 Moore Road, King of Prussia, PA 19406, (215) 337-7100.

CIRCLE INQUIRY NO. 221

Technical computer systems, 3100 and 3105 in the Vector 2 series, are aimed directly at industrial/scientific applications for automating laboratory experiments, procedures and data processing. The 3100 includes a Vector 3 Z80-based processor and terminal, two 5¼-in. double-sided floppy disk drives for a total of 1.2M bytes of storage and an 18-board card cage for a

variety of S-100 bus interface cards. The 3105 has the same terminal and card cage, but with a 5-in. Winchester disk with 5M bytes of storage backed by a single 630K-byte floppy disk. Interface boards available from the manufacturer include a fast-scan video digitizer; a high-resolution graphic module; precision 12-bit digital-to-analog converters; high-speed multichannel analog-to-digital converters; clock/calendar; and a PROM/ROM memory board for additional storage and PROM programming

FAST & FLEXIBLE

TCS Software's TOTAL LEDGER with its own built in data base manager is not just another second generation software package, it's better!

With the data base, TOTAL LEDGER has unlimited options with new monthly, quarterly and yearly comparison functions. Fast, flexible and accurate reporting allows the user to verify entries with greater efficiency. Balanced batched transactions can be edited and deleted prior to posting. Chart of Accounts is kept current at all times so that financial statements can be generated on demand.

The data base manager allows the unsophisticated user to "browse" at will through the data files for up-to-the minute detailed information.

So better your business software needs, it's easy to upgrade TCS, just TOTAL for fast, flexible data base access.

Call for the TCS Dealer nearest you.

713/977-7505

TCS Software

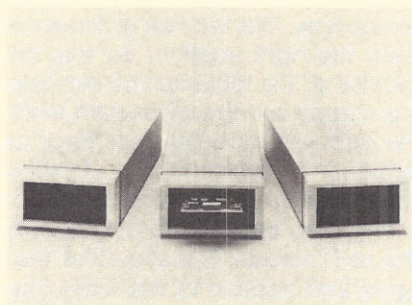
3209 Fondren Road
Houston, Texas 77063



capability. The 3100 system is priced at \$5,795. The 3105 system's basic price is \$8495. Vector Graphic, 500 N. Ventu Park Rd., Thousand Oaks, CA 91320, (805) 499-5831.

CIRCLE INQUIRY NO. 222

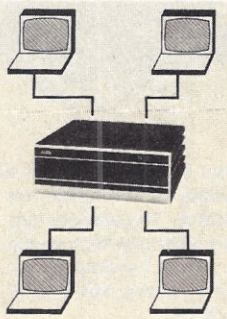
Business computers, Systems 2832/2834 and 2842/2844, combine a 20M-byte or 40M-byte 8-in. Winchester with a 20M-byte ¼-in. cartridge drive for backup. The 2832 utilizes the Super CP/M operating system; the 2842 features an enhanced MP/M or OASIS operating system for multi-user, multi-tasking operations. Both versions have been designed to provide a combination of streaming or file-by-file backup to increase the system's versatility. Only 12 minutes are required to back up



20M bytes. They are compact, self-contained systems having a tape data transfer rate of 30K bytes per second and a tape speed of 30ips. Each tape cartridge features four recording tracks with a recording density of 8,000 bits-per-inch. When unformatted, storage capacity for the tape cartridge is 20M bytes. The System 2832 has a price of \$11,400; the 2834, \$13,160. Systems Group, 1601 Orangewood Ave., Orange, CA 92668, (714) 633-4460.

CIRCLE INQUIRY NO. 220

Multi-user systems, 8000-12 and 8000-14, feature expanded integral fixed disk memory capacities of 20 and 40M bytes. Using Winchester technology, the 8000-12 system offers 20M bytes, or twice the storage capacity of the original system. Likewise, the 8000-14 provides 40M bytes—four times the capacity. The new 8-bit, Z-80 systems have four separate memory partitions, permitting up to four users to perform different applications simultaneously. They are compatible with



an extensive software library, including the CP/M, MP/M, and OASIS operating systems; with hundreds of business application programs and with a wide array of special function software, including data base management and graphics. Languages available include Basic, Pascal, C, Fortran, Cobol, PL/1 and APL. Price: \$9,990 for the 8000-12 and \$11,990 for the 8000-14. Altos Computer Systems, 2360 Bering Dr., San Jose, CA 95131, (408) 946-6700.

CIRCLE INQUIRY NO. 223

Advanced home computer, Commodore-64, is programmable with a CP/M option, and has 64K of memory. The system has a full 66-key typewriter keyboard with upper and lower text capability, function keys, graphic characters, "smart" peripheral devices, a cartridge game slot and game controllers. Its audio capabilities will include sound generation, polyphonic tones, music synthesization and hi-fi output. Price: \$595. Commodore Business Machines, 681 Moore Road, King of Prussia, PA 19406, (215) 337-7100.

CIRCLE INQUIRY NO. 224

Intelligent terminal, MX-700, has eight full pages of memory standard (192 lines of 80 characters) and 16 pages of memory as an option. It can be configured either as a full screen 160 columns by 66 lines or with split screen displaying two 80-column by 66-line pages side by side. Smooth scroll adds 30 additional lines to both configurations. 96 ASCII upper and lower case characters with descenders plus 32 line drawing graphic symbols are standard. Using a P4 Phosphor 17-in. high resolution tube, any combination of characters can be displayed with any combination of attributes—blink, half intensity, reverse video, double high, double wide and double

high/double wide. A single board contains an 8085 microprocessor with direct memory access and 32K bytes of RAM. RS-232C interface is standard. An



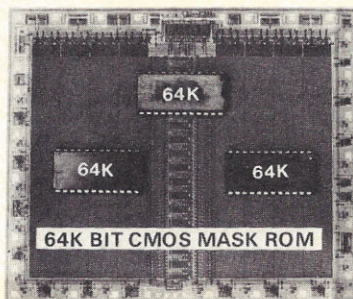
eight-connector STD BUS is provided for convenient memory and I/O expansion. Ten transmission rates, from 75 to 19.2 bps., are keyboard-programmable. The terminals are DEC VT100-compatible. Prices start at \$2,195. Omega Data Peripherals, 4357 Park Dr., Norcross, GA 30093, (404) 923-6342.

CIRCLE INQUIRY NO. 226

Z80 monitor, Bigbug, is designed for TRS-80 level II, to allow full control of assembly language programming. Features include: ROM based monitor (does not need back up); a target program can be resident anywhere in memory; user can set up to 8 break points; tape storage with file name; direct access of I/O; hardcopy for the debugging history; mnemonic key-in of user registers; hexadecimal calculator; can be treated as a subroutine from user program; RS-232 driver software can be built-in; user can put his own EPROM (game, etc.) into this monitor hardware to save loading time. Price: \$75.00. Future Project Corp., P.O. Box 11, Hawleyville, CT 06440, (203) 775-3062.

CIRCLE INQUIRY NO. 227

64K CMOS mask programmable ROM series is introduced with the MP2364C, 64K, CMOS ROM. The unit features low power dissipation and a fast access time.



The true standby supply current value is only 1μA (typical), and while in the idle or non-switching state of the value is only 40μA (maximum). The access time is 450 nS maximum—which appears to be twice

Save \$2500⁰⁰

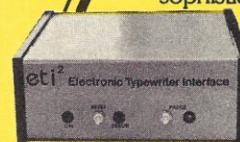
Are you faced with having to spend \$3000 and up for a letter-quality printer?

Mediamix offers an alternative.



For only \$500 the **Mediamix ETI²** lets you connect the IBM Electronic Typewriter Models 50,60, or 75 to **any** computer. Why invest in two separate machines? Your office typewriter can do both jobs, yielding better type quality, a consistent corporate image and renowned IBM service.

The **ETI²** is no simple black box, either. It is a sophisticated micro-computer with 2000 characters of memory, over 39 special commands and the option of doing typesetting on the IBM Model 50.



Write or Call

MEDIAMIX

P.O. Box 67B57
Los Angeles, California 90067
(213)475-9949

PROOFREADER™

The Aspen Software Company Spelling Checker.

GRAMMATIK™

Beyond Spelling Checking

THE ONLY COMPLETE PROOFREADING PACKAGE

FOR ALL CP/M, MS-DOS, AND TRS-80 WORD PROCESSORS

We'll match Proofreader with any other spelling checker on the market. It has a big 38,000 word expandable dictionary, and can check even your largest documents in under four minutes. Proofreader looks up every word, and does not use less accurate root word analysis like some others. Full interactive correction is standard on CP/M and TRS-80 Model II systems, and is a low cost option for the TRS-80 Model I/III.

Spelling checking alone is not enough! No one else has anything like Grammatik! It analyzes your document for common typos, punctuation errors, misused phrases, and poor writing style. Grammatik is receiving rave reviews from both critics and users. Bob Loudon in InfoWorld (12/7/81): "Grammatik is a surprisingly fast and easy tool for analyzing writing style and punctuation. If you are currently doing original writing on a word processor, you should consider this product." Eric Balkan in The Computer Consultant: "I'm impressed with the imagination that went into this product." A user: "Thanks for making my life easier!"

Grammatik and Proofreader are compatible with all CP/M, MS-DOS (including IBM PC), and TRS-80 word processors.

Current CP/M formats:

standard 8", NorthStar, Omikron TRS-80.

Please call or write for details of minimum system sizes, and availability of additional disk and operating system formats. Shipping costs included.

Please specify your system configuration when ordering. Dealer inquiries invited.

MS-DOS versions scheduled for March 1982 release.

	Proofreader	Grammatik
CP/M, MS-DOS	\$129.00	\$149.00
TRS-80 Model II	\$99.00	\$99.00
TRS-80 Mod. I/III	\$54.00	\$59.00
(Model I/III interactive correction option - \$30.00)		

CIRCLE INQUIRY NO. 6

Trademarks: CP/M: Digital Research; TRS-80: Tandy Corp.; Proofreader, Grammatik: Aspen Software Co.

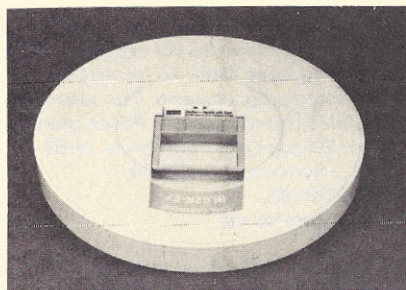
ASPEN SOFTWARE
COMPANY™

P.O. Box 339-A, Tijeras, NM 87059
(505) 281-1634

as fast as competing devices on the market. The unit has a 8192 by 8 memory configuration, interfaces with a number of microprocessors, and is pin-compatible with the Mostek MK36000. The device is packaged in plastic. However, special Cerdip and ceramic packaging can be ordered. Minimum order quantity is 500 pieces. In addition to a nominal programming charge, the price for 1,000 devices (24-pin plastic) is \$17.90 each. Memory Product Marketing, Micro Power Systems, 3100 Alfred St., Santa Clara, CA 95050, (408) 727-5350 ext. 234

CIRCLE INQUIRY NO. 228

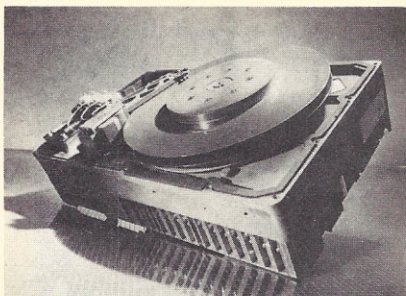
Impact detector, Shockwatch, changes color from white to red when it is affected by an impact of a pre-selected amount of force. The device is a small, tough glass capsule that uses a combination of liquid surface tension and capillary action to detect and flag mechanical shock. This may indicate possible damage to the unit



to which it is affixed. For one of its several uses by the computer industry, it is designed to be an integral part of any of six configurations of disk packs, covering virtually every unit offered by the major manufacturers. Media Recovery, 435 Round Table Dr., Dallas, TX 75247.

CIRCLE INQUIRY NO. 229

Eight-inch Winchester drives, Trak Star, are designed for the support of multi-station business and word processing systems. The family of drives features ANSI interface, a wide range of capacities and fast access times. The unit is available in three versions, with 33, 67 and 84 megabyte capacity. The D-8033 records on 476 tracks per inch, and the 8066 and 8084 on 952 TPI, with all three recording



at 8200 BPI. All models have an average positioning time of 45 μ s, and a data transfer rate of 8.5 M-bits/sec. Overall dimensions are 4.65 in. (118 mm) high, 8.58 in. (218 mm) wide and 14.31 in. (364 mm) deep. Weight is 18 lbs. (8.16 kg). OEM quantity pricing starts at under

\$2,000. Pertec Computer Corp., Peripherals Div., 21111 Erwin St., Woodland Hills, Calif. 91367.

CIRCLE INQUIRY NO. 230

14-in. diagonal screen for video terminals displays 80 or 132 columns in large, crisp characters that measure a full 33% larger than on a 12-in. screen. Available in either green or white display, the 14-in. monitors represent a significant



improvement in readability over the older 12-in. versions and are easier on the eyes of the operator. The screens are also tiltable, non-glare and feature excellent resolution. Visual Technology Inc., 540 Main St., Tewksbury, MA 01876, (617) 851-5000.

CIRCLE INQUIRY NO. 225

5¼-in. Winchester drive, David Subsystem, uses the Seagate ST 506 and provides 5M bytes of formatted storage in a box that is only slightly larger than a normal 5¼-in. mini floppy drive (4.75-in. by 5.9 in. by 11.25 in.). It features 32-bit polynomial, 11-bit burst ECC, automatic flaw mapping and tracking, and write-precompensation. The subsystem is now available with host adaptors for the Apple and the S-100. Konan Corp., 1448 N. 27th Ave., Phoenix, AZ 85021, (800) 528-4563.

CIRCLE INQUIRY NO. 231

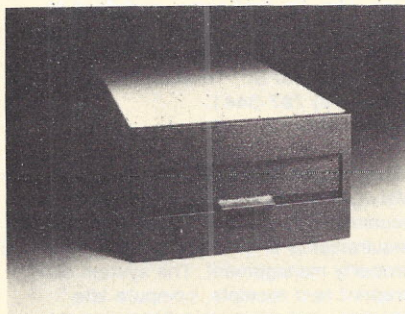
Eight-in. Winchester disk drives, SA1100 series, combine high-capacity and fast access time with easy system integration. Consisting of the SA1104 (20.3-Mbyte, two platters) and SA1106 (33.9-Mbyte, three platters), the series offers advanced functionality to the new system designer, as well as simple upgradability to the current user of Shugart's SA1000 series of eight-in. Winchester drives. The series uses Fastrak closed-loop servo positioning system to offer 35-mS average access time, the fastest in the low-cost eight-in. Winchester marketplace. The positioning system also provides recording densities of 500 tracks per in. Both of these specifications represent significant performance increases over the SA1000 Series, whose open-loop stepper system provides 172 TPI and 70-mS average access time. Other key specifications of the SA1100 series include 10-mS track-to-track access time, 70-mS maximum access time, 4.34-megabit/second transfer rate, and an MTBF goal of 10,000 power-on hours. Scooros said the drive is targeted for stand-alone systems. The series features a brushless DC spindle motor and requires only +24VDC and +5VDC power supplies, eliminating the requirement for AC power

APRIL 1982

and the multiple configurations needed to address worldwide power requirements. Prices: SA1104 - \$1,550, SA1106 - \$1,875. Shugart Assoc., 475 Oakmead Parkway, Sunnyvale, CA 94086, (408) 733-0100.

CIRCLE INQUIRY NO. 232

5¼-in. floppy disk drive, A-70, stores 286K bytes, a full 12% increase over the 256K bytes found in 8-in. floppies. Superior engineering results in improved performance. A longer, two-piece clutch means accurate diskette registration and less media distortion. A steel band



positioner provides faster head positioning and gives the disk drive about half the seek time of an 8-in. drive. Full software support provided with each drive includes compatibility with DOS 3.3, Pascal and CP/M. Price: \$699. The Schraff Group, 1000 Quail, Suite 140, Newport Beach, CA 92660, (714) 833-3660.

CIRCLE INQUIRY NO. 233

Reconfiguration adapter, the RS-232 DB25, consists of a printed circuit card with one male and one female DB25 connector mounted on it and incorporates a special matrix switch. This device enables users to instantly mate almost any serial I/O device to any computer by rerouting RS-232C signals. The device eliminates the task of fabricating special cables or resoldering existing cable wiring to achieve signal interfaces between a computer and peripheral I/O device, such as a modem, printer or terminal. A simple flat cable with DB25 connectors and the adapter will tie the proper signal lines together. Price: \$59.95. Mountain Computer, 300 El Pueblo Rd., Scotts Valley, CA 95066, (408) 436-6650.

CIRCLE INQUIRY NO. 234

All-points-addressable graphics package for Microline family of printers will enable users to address a dot anywhere on the printed page to create illustrations with even, flowing lines. The product gives users a resolution of 60 horizontal dots by 66 vertical dots per in. A software algorithm, which is included with the package in the form of a floppy diskette, allows users to easily translate data displayed by an Apple computer into parallel data that can be used by the Microline printers. An Apple computer displays data in a format of 280 by 192 dots per square in. The package is available for the Microline models 82A and 83A currently being sold. As a standard feature on the model 84, the package provides users with a resolution of 72 dots by 72 dots per square in. The package available for the 82A and 83A consists of

two programmable ROM modules and a floppy diskette, and is easily installed. Price: under \$100. Okidata Corp., 111 Gaither Dr., Mt. Laurel, NJ 08054, (609) 235-2600.

CIRCLE INQUIRY NO. 237

24-hour life surveillance system

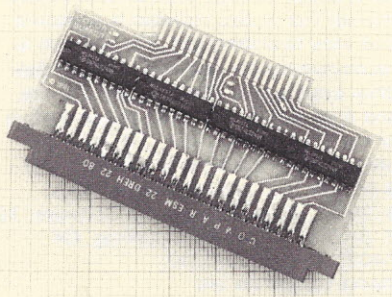
measures 5 in. by 7.7 in. by 1.75 in. It is for use in home and office. It is capable of issuing an ALERT signal (audio and visual) if there is development of any abnormality in human system. It is self-evaluative in nature and automatic. The system can be used to monitor babies in their early developments. It can also be used to detect potential ailments such as heart attacks, hypertension, etc. The system monitors temperature, pulse rate, respiration rate and blood index of MERIT continuously. This universal diagnostic system has been developed to serve as LIFE ALERT device in potential diseases and also to track development of abnormality in early stages of development. Medical Devices, 5540 Century Manor Ct., San Jose, CA 95111, (408) 972-1093.

CIRCLE INQUIRY NO. 238

Executive Accounting System is a complete accounting system for the Apple III computers. It is completely menu-driven and designed to be user-friendly, so no previous programming knowledge or experience is needed to operate it. The package records all financial transactions and generates standard financial reports. The system also prints checks, statements, and invoices, while calculating receivables aging and finance charges. Expandability includes provision for adding modules to handle inventory, letter writing, budgeting, graphic analysis and payroll. The system is being adapted to run on an expanded Apple II Plus and a Commodore Super Pet. Denver Software Co., 14100 Jewell Ave., Suite 15, Aurora, CO 80012, (303) 750-9980.

CIRCLE INQUIRY NO. 239

Color Buffer is a peripheral for the TRS-80 Color Computer. Gaining access to the system bus through the game slot cartridge, the device terminates in the standard 22/44 card edge connector, providing the hobbyist or experimenter with easy access to fully buffered address, data



and control lines. It also serves as a building block, allowing the user to plug in a variety of other peripherals now under development. The products include a RAM Cartridge, serial and parallel I/O board and an EPROM programmer. Price: \$59.95. TBH Canada, 67-3691 Albion Rd., Ottawa, Ontario, Canada K1T 1P2.

CIRCLE INQUIRY NO. 235

Help!



HELP IS COMING FOR ALL PERSONAL COMPUTER OWNERS:

Stop going broke buying software and hardware to find out it's not what you want!

The Personal Computer Owners Directory can eliminate a lot of wasted time and aggravation.

Through the use of the directory, you can become aware of people in your area and nationally who have the same system or interests. Find out what is worth buying before spending your \$\$\$\$\$. The directory will be listed by cities and interests (e.g.)

Games, business, art, robotics, education, etc.)

To have your information listed and place your order for the Directory, SEND \$19.95 ppd (check or money order) plus the following:

Name, Address, Computer Type, Interests, will you help others, are you willing to trade information? Plus any other vital information.

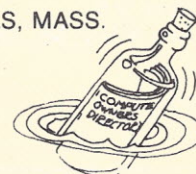
If you want your name entered, but do **not** wish to receive a directory, send \$1.00 and the above info.

The directory will be open for listings until May 1, 1982, at which time it will go to print.

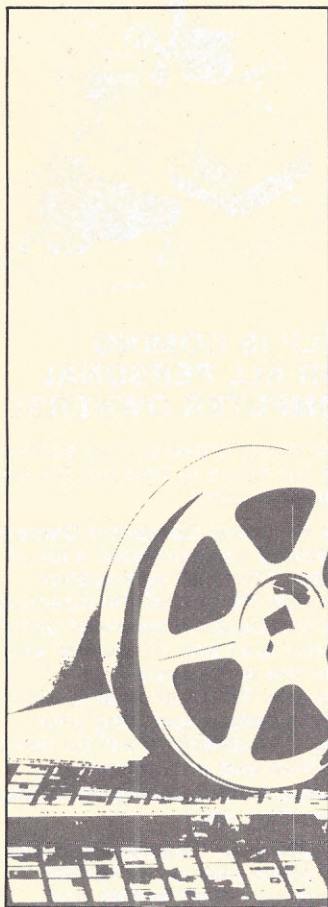
MASS. residents add 5% sales tax.

PERSONAL COMPUTER OWNERS, INC.

P.O. BOX 426
FEEDING HILLS, MASS.
01030
(413) 789-1555



This Publication is available in Microform.

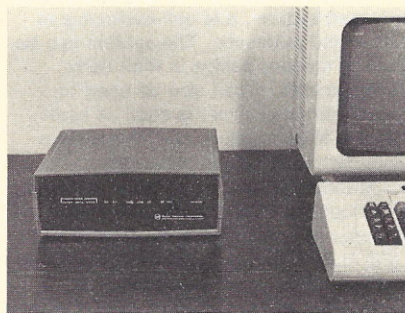


University Microfilms International

Please send additional information
for _____
Name _____
Institution _____
Street _____
City _____
State _____ Zip _____

300 North Zeeb Road
Dept. P.R.
Ann Arbor, Mi. 48106

Voice/data modem, ADA VIII, integrates voice and data output, with the resulting important capability to communicate—either by standard data link or by voice-synthesized messages—in easily comprehensible, human-like language. The modem enables any computer to perform four valuable functions: place or receive telephone calls; bi-directionally transfer data at 300 baud; speak in unlimited vocabulary of synthesized voice; receive



touch-tone information from distant telephones for control or data retrieval. This flexible interactive system connects to the host computer via an RS-232 interface, a standard interchange for computers, printers, modems and other peripheral devices. Through this communication link, all instructions to the ADAS can be issued, and status indications and modem data communicated. Butler National Corp., 8246 Nieman Rd., Lenexa, KS 66214, (913) 888-8585
CIRCLE INQUIRY NO. 236

Scheduling program, Guardian, keeps an accurate calendar of single events, or an entire series, for years ahead. It has the storage capacity to organize up to 2,000 separate events for 200 people at once. All appointments and events, from tax deadlines to anniversaries and dental appointments to oil changes can be recorded simply and easily with single one-line entries, in plain English. It also internally adjusts its own calendar to allow for accurate planning, years in advance. It can be logged to flag events ahead of time. No computer language or knowledge is necessary to draw maximum use from the program. An on-line instruction manual that communicates in plain language will carry its operator through each step. A printed manual that is also included is complete and easy-to-understand. The program is recommended for use with any soft-disk drive system with 48K memory or more, and operates on any CP/M-based system or the TRS-80 (models I, II or III). The program is available on standard 5¼ or 8-in. disk, with storage sleeve. Price: \$199.95. Time Management Software, 123 E. Broadway, Box 727, Cushing, OK 74023, (918) 225-6340.
CIRCLE INQUIRY NO. 240

Mail-merge system, Mail Mate, can operate with the Magic Window word-processing system or by itself as a stand-alone mailing/phone list system. To merge letters produced from the word processor, the user must produce a softcopy in the printer subsystem. This softcopy is not restricted in size. The system accesses the softcopy and merges it with the

addresses and names selected from the user's address list. The highlights of the system are: extremely quick sort on either the Last Name or the First Address Line field (usually the company name); string search on names of uncertain spelling; 10 selection fields (36 acceptable alphanumeric codes per field); flexible specification of selection codes for printing and logical ANDing between selection fields. It can operate on a single disk drive system holding up to 500 addresses per diskette, and prints the address list with either one or two addresses across. It includes field for area code and phone number and flexible salutation specification (Mr, Ms, Miss, Mrs, Dr, first name, or default to salutation on softcopy). All fields are fully edited. Price: \$85. Evolution Software, 1632 Bathurst St., Toronto, Canada M5P 3J5, (416) 787-3441.

CIRCLE INQUIRY NO. 241

Information program, Property Management System, is designed to accommodate the accounting and control requirements of commercial and residential property management. The system can preprint rent receipts, compute late charges, and generate rent increase or delinquency letters automatically. In addition, the system will also calculate charges for common area maintenance, interest on security deposits, and percentage rents when applicable. The system makes possible more efficient accounting methods for both single and multi-fund accounting, including accounts payable, payroll and cash receipts processing. Optional applications that can be added easily without the need for customer programming include: loan amortization, investors payable, HUD reporting, mortgages payable, and mortgages receivable. MAI Basic Four Information Systems Div., Box C-11921, Santa Ana, CA 92771, (714) 731-5100.
CIRCLE INQUIRY NO. 242

Spelling proofreader, Spell, is available for CP/M and Heath/Zenith HDOS systems. It detects misspelled words in documents created by most text editors and word processors, including WordStar and Magic Wand. User-engineered flexibility allows the listing of unknown words, marking them in the document for easy editing, or adding them to the dictionary. Effective dictionary size is over 50,000 words with user-expandable prefix/suffix table. The program processes 4,000 input words per minute and requires 48K of RAM. It is available on 8-in. CP/M disk, and 5-in. Heath/Zenith CP/M or HDOS disk. Price: \$49.95, plus \$3 shipping. Software Toolworks, 14478 Glorietta Dr., Sherman Oaks, CA 91423, (213) 986-4885.

CIRCLE INQUIRY NO. 243

Medical applications package, Medical Office Management III, includes a full appointment management element, a private patient accounts receivables system and an insurance form preparation system. The system is designed for larger medical practices and features such items as cycle billing and time-of-service insurance compatible billing. The system is designed for an Apple III with 128K of RAM and from one to four Apple SOS operating system

compatible hard or mini-floppy disk drives. Charles Mann & Assoc., Microcomputer Div., 55722 Santa Fe Trail, Yucca Valley, CA 92284, (714) 365-9718.

CIRCLE INQUIRY NO. 244

Bill-of-materials program is an option to GOLD Inventory, designed to provide a multi-level parts explosion with unlimited levels to manufacturers. The system provides a "where used" lookup on a component, a "materials requirements planning report" and will record production in the Inventory program. The program is written in CBasic2 and runs on most CP/M systems with hard or floppy disks and comes with source code. Douthett Enterprises, 906 N. Main, Wichita, KS 67203, (316) 262-1040.

CIRCLE INQUIRY NO. 245

Project management system, PMS-II, has been expanded to include two major capabilities. It now provides for the preparation of NET CHANGE reports that compare the current status of a project to a previous status. Gains/losses are calculated and displayed in both calendar and net working days format. The program can accommodate over 1,000 activities per project, making it ideal for many large project control tasks within almost all types of industries. Features include: the ability to calculate a critical path schedule based upon three, four, five, six or seven days per week, while omitting up to 100 holiday periods, coupled with the multiple option REPORT WRITER, GANTT chart processor and cost control. It will run on any microcomputer with Digital Research's CP/M 2.2 operating system and Compiler Systems CBasic2.07. Two 8-in. disk drives and a 132-column printer are required. Price: \$995. North America MICA, 11772 Sorrento Valley Rd., Suite 240, San Diego, CA 92121, (714) 481-6998.

CIRCLE INQUIRY NO. 246

Business application package, The Depreciation Planner, is for use on the Apple microcomputer. It is designed to keep track of depreciable assets for accounting and tax planning purposes. The package incorporates both the previous depreciation methods (to be used for assets purchased before January 1981), as well as the new depreciation methods (to be used for assets purchased after January 1981). It is faster than manual record keeping. It reduces chances of error and alleviates excess paperwork. The user determines cost, salvage amount, useful life, and special restrictions or conditions pertaining to the asset and depreciation method. Once these figures are entered, the program will automatically keep track of each asset. The documentation includes a complete glossary and modeling workbook to introduce users to the concept of depreciation and to give them hands-on experience with the software package. The program will provide significant benefits not only to businesses, but also to accountants. Accountants can use the program to record all assets and depreciation information for their individual clients. Dakin5 Corp., 7475 Dakin St., 4th Fl., Denver, CO 80221, (303) 426-6090.

CIRCLE INQUIRY NO. 247

Word processing package, Typist, is menu-driven and can be used with any standard CRT and terminal keyboard to add multi-user, shared-logic word processing capabilities to minicomputers that use the company's IRIS operating system. The package offers more than 40 editing functions, including cut and paste, search and replace, abort, move by word, letter or line. Cut and paste cuts a marked section of text and stores it for pasting later. Abort can undo any edits currently stored in memory only. All text is stored on disk, and the program allows for storage and retrieval of sections of text so that a document can be built from previously stored paragraphs. Documents can be stored on any logical unit of an IRIS system; a 16M-byte disk can store more than 4,500 pages of the program's text. Typist gives multi-level security protection, utilizing individual passwords, log verification and encrypt command capabilities. Price: \$2,000. Point 4 Data Corp., 2569 McCabe Way, Irvine, CA 92714, (714) 754-4114.

CIRCLE INQUIRY NO. 248

Accounting software packages, V8 series, is available for the CP/M-enhanced version of the Wangwriter. Packages are now available for general ledger, accounts payable, accounts receivable, payroll, inventory management, sales invoicing and client posting and accounting. All are written in Microsoft Basic, supplied in compiled form and feature the Visionary screen manager. Price for the client posting and accounting package is \$995. Others cost \$595. Management Science America, Suite 1300, 3445 Peachtree Rd. NE, Atlanta, GA 30326.

CIRCLE INQUIRY NO. 249

Project Management programs are designed to aid the engineer or manager in planning, monitoring and controlling projects with multiple activities, resources and varying operational times. This group includes programs on critical path analysis, program evaluation and review technique (PERT), resource allocation and activity on node network analysis. The library of micro-software is tailored to fit the requirements of practicing industrial engineers and managers. All programs are available for the TRS-80, models I and III and also will soon be available for the Apple II systems. Price: \$120 for a set of four programs. IIE Technical Services Dept., 25 Technology Park/Atlanta, Norcross, GA 30092, (404) 449-0460.

CIRCLE INQUIRY NO. 250

Accounts payable package utilizes the computer language, Protege, which is user-oriented to best suit the individual's bookkeeping requirements. Features include special provisions for manually issued checks, a complete audit trail, automatic check printing, flexible methods of payment, vendor purchase history, and facilities to interface with the other accounting systems, such as general ledger, accounts receivable, payroll and invoicing/inventory. Prodigy Systems, 497 Lincoln Highway, Iselin, NJ 08830.

CIRCLE INQUIRY NO. 251

N/C program for Apple II, Arrowcode 15, is a programming language written for mills,



ATARI

400 w/16K	\$ 339 ⁰⁰
800 w/16K	\$ 739 ⁰⁰
810 Disk Drive	\$ 449 ⁰⁰
830 Modem	\$ 159 ⁰⁰
850 Interface	\$ 159 ⁰⁰
16K module	\$ 85 ⁰⁰

EPSON

MX-70	CALL
MX-80	CALL
MX-80 F/T	CALL
MX-100	CALL
Graphics kit	\$ 85 ⁰⁰

Interface cards and cables available for your machine!

We'll attempt to meet or beat any advertised price



HP-85A w/16K	\$2595 ⁰⁰
HP-125	\$2995 ⁰⁰

TELEVIDEO

920C	\$ 729 ⁰⁰
950	\$ 939 ⁰⁰

ZENITH

Z-19	\$ 725 ⁰⁰
Z-89	\$2150 ⁰⁰

Call for more great prices on NEC, BMC, Northstar, Altos, Soroc, Amdek ... and others.

prices subject to change without notice

LO-BALL COMPUTERS

P.O. Box 1818
Beaverton, OR 97075
APO/FPO welcomed

CALL (503) 641-0211

Ordering Information: For fastest service, send money order, cashier's check or bank wire. Visa and MC orders, add 3%. Personal checks accepted (allow minimum 10 days to clear). Hours 9-5, M-F.

Call For Our Free Price List

Buy with Confidence from the best

GREAT PRICES, GREAT SERVICE, GUARANTEED
COMPUTERS, PRINTERS, TERMINALS

Apple
IEEE 488
card now
available

CALL TOLL FREE: 1 800 421-1520
In Calif. 213 320-4772

COMPUTERS & TERMINALS

CALL TOLL FREE FOR PRICES

COMPUTERS:

Altos
Apple
Atari
Commodore
Hewlett-Packard
B.M.C.
Interlec/Superbrain
N.E.C.
Northstar
Onyx
Point Four
Sharp
Televideo
Vector

Xerox
Zenith

VIDEO TERMINALS & MONITORS:

ADDS
Amdek
Ampex
Apple
B.M.C.
Hazeltine
I.B.M.
Lear-Siegler
N.E.C.
Sanyo
Soroc
Televideo
Zenith



Special #1
Joyport for your
Apple Use 2 Apple
paddles & 2 Atari
joysticks
Reg \$74.95
Only \$59.95

Special #2
9 ft. 9 pin RS232
cable
Only \$19.95

PRINTERS

D.C. Hayes
Modems
at great prices.

THERMAL

Apple
Trendcom

DOT MATRIX

Anacom
Anadex
Centronix
Commodore

ACCESSORIES

CP/M
Fortran
Pascal
Vanguard AP/L

OTHER PRODUCTS

Bar Code Readers
Card Readers
Game Controls
Graphics Tablet
Music System
Numeric Keypads
Programming Aids
Type-and-Talk
Video Digitizers
Voice Entry

We have IBM
software.

Special #3
Complete
graphics system
by Penguin
software
Reg \$59.95
Only \$45.00

80 COLUMN VIDEO CARDS

Double Vision
Smart-Term
Videx

LOWER CASE ADAPTERS

Dan Paymar

INTERFACE CARDS

Apple
California Computer
Mountain Computer
Microsoft
S.S.M. Products
Thunderclock

LANGUAGES

Basic Compiler
C.I.S. Cobol

The best non-technical
"How to Choose a Computer
Book for Laymen." \$12.95.
Complete Directory for
Apple Software only \$14.95.

PRINTERS - MONITORS

NEW
MX 100 &
MX 80 F/T

MONITORS

BMC & NEC Green Screen
NOW IN STOCK

EDUCATORS

We have the CORVUS
systems to hook up several
Apple computers at once!

NEC & DIABLO PRINTERS

Anadex, Paper
Tiger. CALL
for latest prices

The new 136
column Epson
printer with graphics and the
Friction/tractor MX 80 are in
stock. WE HAVE THE GRAPHIC
PACKAGE FOR MX 80. coll.

SILENTTYPE PRINTER
ONLY \$284.00

ACCESSORIES - SOFTWARE

Special #4
Special PFS and
PFS Reporter for
Apple
Reg \$99.00
Only \$69.00 each

Call for catalog

Visicalc 3.3 \$159/Reg \$199
BPI GL/INV/AR/each 299/Reg 399
Tax Preparer by Howardsoft 79/Reg 99
Real Estate Analyzer, Howardsoft 125/Reg 150
Creative Financing, Howardsoft 125/Reg 150
ASCII Express II by SDS 55/Reg 65
Z-TERM (CPM) (16 sector) 85/Reg 100
TRS 80 & ATARI SOFTWARE TOO

PLOTTERS
Bausch & Lomb plotters
for your computer by
Houston Instruments
CALL!

MICROSOFT 16K Ramcard \$139

CALL TOLL FREE

1(800)421-1520
In Cal (213)320-4772

Dysan Disks for Apple, only
\$3.95. Avery mailing labels,
5000 for only \$14.95.

20% OFF RETAIL ALL SOFTWARE
If you don't see it, call us and we'll get it!

Mail orders ONLY:

NET PROFIT COMPUTERS

2908 Oregon Court, Bld G1
Torrance, Ca 90503
1(800)421-1520
in Cal: 213 320-4772

2% shipping and 3% for charge cards.

lathes and punches; consisting of 15 code words that enable the N/C programmer to define part geometry with little or no trig involved, as well as a CRT plot at the time of code-word entry, resulting in a finished N/C Part Program. Features include: complete editing, CRT plot, tool offset, mirror image, pattern rotate, pocketing, bolt holes, threading, parabola, optimizing, shop math, CNC and timeshare compatible. Post processor are available for most N/C Control units. Price: \$1,950. Arrow Data Systems, 5910 E. Washington Blvd., Los Angeles, CA 90040, (213) 726-9440.

CIRCLE INQUIRY NO. 252

Portfolio management system, Portware, consists of three modules: PORTRATE (analysis), PORTRAC (accounting), and PORTREND (performance). It is suitable for serious investors, investment advisors, trust departments, investment clubs, business finance courses, pension/profit-sharing funds, investment companies, and others. The software runs on the one or two disk 48K Apple II+. The system operates from generally available financial data, which is easily input and corrected. Records are concurrently updated from latest prices, transactions, and stock splits/dividends. There is a provision for margin positions and tax-lots. All transactions affecting cash are tracked, analyzed and summarized. There is no limit to the number of portfolios, each up to 35 long or short positions, including common and preferred stocks, bonds, options, rights, warrants, T-Bills, investment companies, unit trusts and cash. The program is self-instructing and menu-driven...easy to use by non-professionals in investments and computers. Price: \$195. Portware, 5724 Tucker Ln., Edina, MN 55436, (612) 854-9433.

CIRCLE INQUIRY NO. 253

Labor cost payroll program is designed for developers, contractors, subcontractors, manufacturers, and any employer requiring full labor costing as a management tool. The program has three fields available for breakout and ultimate testing of hours and dollars. Contractors would use job, building and function. Others might use division or branch, department, function or job assignment. Printouts include paychecks, timecards, check register and recap, (Current, MTD, QTD and YTD totals, including employer's payroll taxes, union costs, worker's compensation and liability insurance), individual job and composite jobcost printouts, and union and state tax report supplements. The labor cost payroll program is written in the popular CBasic language with disk filing under CP/M. 64K RAM and 2 drives are required. W2s require 132-column printer. The program is mailed on 8-in. single density disk requiring IBM compatibility. Cal Data Systems, 150 Fleker St., Suite B, Santa Cruz, CA 95060, (408) 429-1839.

CIRCLE INQUIRY NO. 254

Accounting software is now available for use with the CP/M operating system. The programs are fully integrated and include: general ledger/cash journal, accounts receivable/invoicing, accounts receivable/balance forward, accounts payable, inventory control and payroll/job costing.

Taranto & Assoc., Box 6216, San Rafael, CA 94903, (415) 472-2670.
CIRCLE INQUIRY NO. 255

Basic compiler, TASC, for Applesoft Basic programs, converts a standard Applesoft Basic program into machine code, enabling the program to execute much faster than was previously possible. This new tool will allow Apple owners to increase the speed of their Applesoft programs dramatically without having to learn a new programming language. Speed increases range from 2 to 20 times over regular Applesoft programs. The compiler has the ability to compile and run even large, complex Applesoft programs. It also provides powerful Basic language extensions including True Integer Arithmetic, Integer FOR...NEXT, and Chain with COMMON. It requires an Apple II or II Plus, Applesoft Basic, 48K RAM and one disk drive. Microsoft, 400 108th Ave. N.E., Suite 200, Bellevue, WA 98004, (206) 454-1315.

CIRCLE INQUIRY NO. 256

Cobol compiler, Level II Cobol, fully implements the following ANSI language modules to the highest specifications (Level II) of the ANSI standards for Cobol: nucleus, table handling, sequential I/O, relative I/O, indexed I/O, interprogram communication and sort/merge. This means that mainframe application programs written to ANSI 74 Cobol standards will be portable to microcomputers with minimal conversion. Micro Focus, 1601 Civic Centre Dr., Santa Clara, CA 95050, (408) 496-0176.

CIRCLE INQUIRY NO. 257

Information processor, Servant 3.2, gives any user the ability to store and manipulate information without being bullied by the microprocessor. The system allows any user, regardless of programming or computer knowledge, to use the system through a series of simple prompts. Features include: up to 20 categories of information, graphic instruction, a machine language sort, updating of numeric categories by any percentage, and a text editor with a form letter generator. Other features are present in the eight-moduled system, allowing specialization to the highest degree. Price: \$79.95. The Computer Connection, 13359 Killion St., Van Nuys, CA 91401.

CIRCLE INQUIRY NO. 258

Relocatable assemblers, the Macro-68 for Motorola's 6800 and Macro-18 for RCA's 1802, both run on CP/M-based systems. Each assembler has a powerful macro and conditional assembly syntax and generates an improved Microsoft-compatible relocatable object file. The format even allows the relocation of 8-bit expressions, a capability not previously available. Included with each assembler is a relocatable linking loader and a library manager. Syscon Corp., 4015 Hancock St., San Diego, CA 92110, (714) 222-6381.

CIRCLE INQUIRY NO. 259

Program generator, Genesis, accepts commands in conversational English, has almost limitless memory capacity to code

difficult algorithms and generates efficient code in excess of four lines per second. It runs on all CP/M2.XX systems and uses compiled PL/1-80, although PL/1-80 is not required to run the program. Code is generated in CBasic. The programs comes with on-line documentation and instructions, and a complete, concise printed manual. Developers of this new program generator recommend its use with any disk system with 48K or more. The program comes on standard 5 1/4 or 8-in. disk, with storage sleeve. Price: \$500. Time Management Software, 123 E. Broadway, P.O. Box 727, Cushing, OK 74023, (918) 225-6340.

CIRCLE INQUIRY NO. 260

Program generator is for RM/Cobol under CP/M, MP/M, OASIS, MOASIS and UNIX (ONYX hardware). The program allows you to: use your computer to program itself; increase the number of bug-free lines of RM/Cobol programs produced in a given period of time; standardize the code generated and reduce documentation costs; perform experimental "building" of an application system quickly to assist in the definition/specification phase; reduce dependency on highly-skilled programming talent for the many things that can now be done as relatively simple tasks. Price: \$1,500 for CP/M, MP/M and OASIS systems. MOASIS and UNIX (ONYX hardware) prices are \$2,000 and \$2,500, respectively. Cybernetics, 8041 Newman Ave., Suite 208, Huntington Beach, CA 92647, (714) 848-1922.

CIRCLE INQUIRY NO. 261

RS-232 printer driver is for the 16K model I, level II, TRS-80 equipped with an RS-232C board. This driver is coded in assembly language and interfaces with the LLIST and LPRINT commands. Serial printers are difficult to support due to their wide variety of functions, features, timing delay requirements, etc. This driver has 16 user-selectable options that allow it to interface to almost any type of serial printer. Options include: form length, pagination, carriage width, null-after-C/R insertion, L/F after C/R insertion, hardware handshake and X-ON/X-OFF recognition. Price: \$35. Micro Systems Software, 3235 Kifer Rd., Suite 32, Santa Clara, CA 95051, (408) 735-1650.

CIRCLE INQUIRY NO. 263

Optical keyboard uses interruption of light beams to detect key movement in a patented process involving one-third the parts of a normal keyboard. When an OTI key is pushed, a patented matrix of LEDs and sensors detects the stroke. The optoelectronic components are multiplexed by pulsing the LEDs and scanning the sensors, simultaneously reducing power consumption and component failure rates. Although one LED and one sensor are uniquely associated with each key, the patented matrix achieves an average of at least three keys per LED and sensor. No phantom keys can be detected, and N-key rollover becomes an easily achieved feature. Standard OTI keyboards with 94 keys are available immediately. Prototypes of custom models are available 90 days after receipt of purchase orders and specifications. Optical Techniques, 1800

E. Garry, Suite 219, Santa Ana, CA 92705, (714) 540-9040.

CIRCLE INQUIRY NO. 270

Fast floating point, 68343, supports the MC68000 microprocessor. It performs arithmetic, transcendental and conversion operations for single precision (32-bit) floating point numbers. These operations are subroutines that simply use MC68000 code in an efficient manner. This code is optimized to a high degree, allowing floating point operations to execute in software, in many cases faster than hardware floating point co-processors and units. To use the software, no special hardware is required, no special traps need be accounted for, no interconnects are needed to other components, no additional board space is consumed and the additional costs are negligible. Either all of the routines, or just those that will be typically used in the customer's end system, can be included in the system's library files called at any time by either the operating system, applications programs, or user programs. Routines are all relocatable and position independent. The only system requirements are an MC68000 to execute code. Price: \$495. Motorola, MOS Integrated Circuits Div., 3501 Ed Bluestein Blvd., Austin, TX 78721, (512) 928-6845.

CIRCLE INQUIRY NO. 264

Listing and cross-reference generator, BPSXREF for Microsoft's Basic-80 5.x language, will produce a formatted listing and an alphabetized list of program variables and function cross-referenced to the line numbers where they are used. The formatted listing allows for page titles, page numbers and skipped lines for added clarity in program documentation. A variety of options allow the user to decide whether he wants a simple listing or only a detailed cross-reference, or some combination of listing and cross-reference.

The generator operates on ASCII-formatted CP/M files as produced by MBasic's SAVE command with the "A" option, or text editors such as Ed, Wordmaster and Mince. This is the same file format required by Microsoft's Basic compiler, Bascom. This tool is a benefit to programmers who are developing complex application systems in the Microsoft Basic language. It provides a convenient documentation tool for a language notorious for its lack of programming discipline and documentation. It requires a 48K CP/M-compatible operating system. Price: \$124. BPS, 82 Woods End Rd., Fairfield, CT 06430, (203) 254-1659.

CIRCLE INQUIRY NO. 262

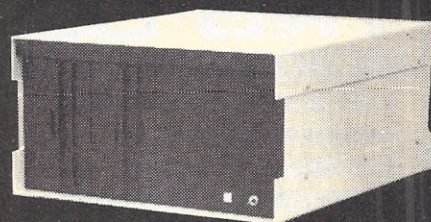
Remote communications package, Intercom, for the CP/M operating system is available for Zenith, Radio Shack model II, Cromemco, Ohio Scientific and Apple II computers. The package (written in 8080 code) is designed for interactive communications as well as verified quantity file transfers (including object files) using several standard protocols. Other features include four auto-sign-on routines, four user-definable routines, batch mode for unattended operation, CP/M system level commands including directory with disk space utilization. Price: \$75. End of File,

Main/Frames

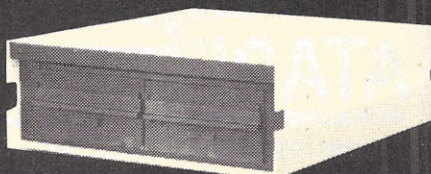
Main/Frames

from
\$200

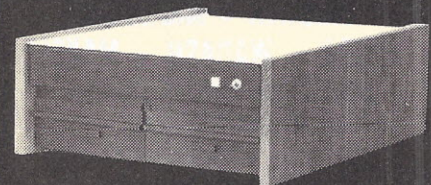
- 30 Models of Enclosures
- Assembled and tested
- Quasi-Coax Motherboards
- Power Supply
- Card cage and guides
- Fan, line, cord, fuse, power & reset switches



8" Floppy Main/Frame



8" Disc Enclosure



Phase/80 8" Floppy Mainframe



Phase/80 Desk + Mainframe

Write or call for our brochure which includes our application note:
"Building Computers — A Recipe"

INTEGRAND

8620 Roosevelt Ave. • Visalia, CA 93291
209/733-9288

We accept BankAmericard/Visa
and MasterCard

**We will meet or
beat any price
in the U.S.A. on**



TRS-80 MICROCOMPUTERS

In fact, no matter what price you see advertised by Texas Computer Systems, Micro Management, Computer Plus, Pan American, or any authorized Radio Shack dealer for TRS-80 Computers with pure factory installed memory and full warranty, we'll beat it!

ATARI®
MICROCOMPUTERS



We have consistently offered the best prices on

**APPLE • COMMODORE VIC-20
OKIDATA • MICROLINE
EPSON • WABASH • MAXELL**

— plus a complete line of Diskettes, Monitors, Modems and other accessories — all at the best delivery from the largest inventory in the Northeast.

If you're looking for the best prices in the U.S.A., check the others, but call Computer Discount of America.

TRS-80 and Radio Shack are trademarks of Tandy Co.

Write or call for FREE Computer Catalog with pictures, specs, accessories and prices.

**CALL TOLL FREE:
800-526-5313**

**Computer
Discount
of America**

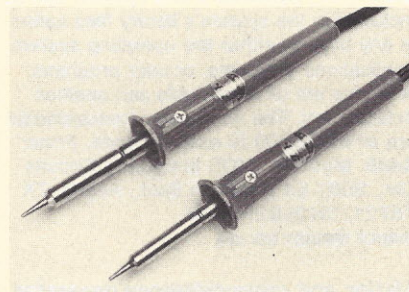
COMPUTER DISCOUNT OF AMERICA, INC.
15 Marshall Hill Road, West Milford Mall
West Milford, New Jersey 07480-2198
In New Jersey Call 201-728-8080

3140 E. Shadowlawn Ave., Atlanta, GA 30305, (404) 233-9825.
CIRCLE INQUIRY NO. 265

Outpost features eight levels of play and several convenient features, such as user-defined keys, sound on/off toggle, escape for temporary interruptions of the game, and a restart function. The game requires an Apple II with 48K and one disk drive. It is compatible with the Joyport program. Price: \$29.95. Sirius Software, 2011 Arden Way #2, Sacramento, CA 95825, (916) 920-1939.

CIRCLE INQUIRY NO. 266

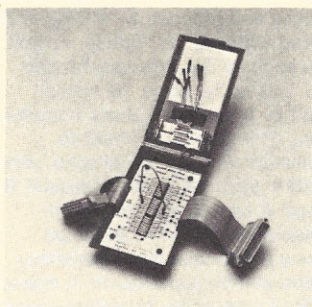
Precision soldering irons, PT series, eliminate P.C. board damage caused by excess heat build-up of nichrome and ceramic heater soldering irons. The irons heat up to the optimum soldering temperature (260 C (500 F) - 300 C (572 F)) in just one minute. The irons also



feature quick temperature recovery. They use only 15-20W in operation and less than 10W idling. Goot Soldering Irons and Accessories, 2305 W. Victory Blvd., Burbank, CA 91506.

CIRCLE INQUIRY NO. 267

RS-232 I/O line tester can save users time and expense by pinpointing signal discrepancies. The pocket-size device connects between the user's equipment

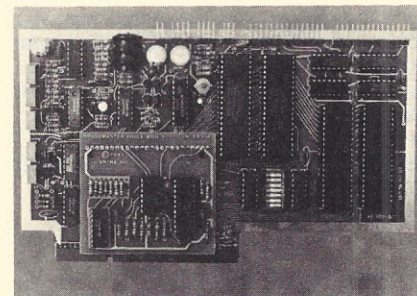


and the communication line to differentiate 12 different signals. Interface pins can be cross-patched with the tester's connection jumper wires to test and correct problems. It cuts repair costs by helping users pinpoint transmission difficulties before a technician is called. LEDs monitor the following signals: TS (2), RD (3), RTS (4), CTS (5), DSR (6), DCD (8), TC (15), RC (17), DTR (20), SQ (21), RI (22), and Busy (25). Price: \$199. Inmac, 2465 Augustine Dr., Santa Clara, CA 95051.

CIRCLE INQUIRY NO. 268

Printed circuit card for the H-89, Housemaster, provides the system with four separate peripherals on a single

printed circuit card. These include voice recognition, stereo sound synthesis, a real-time clock/calendar, and a BSR-X-10 home control interface. Available options are a battery backup for the clock, two types of voice synthesis and two RS-232 serial



ports. All options mount on the same board. A full disk of 17 programs is provided, along with a 90-page manual. The programs are written in either Basic or Assembly language and demonstrate all of the features on the board. Prices: \$299 for the kit and \$399 for the assembled, calibrated and tested version. Artra, Box 653, Arlington, VA 22216, (703) 527-0455.

CIRCLE INQUIRY NO. 269

4K CMOS RAM, the MP6504, is a pin-for-pin replacement for the Harris HM6504 RAM. It has a true standby supply current value of only 1µA and while in the idle or non-switching state the value is only 40µA (maximum). These low-power values are achieved through the use of a High Density Silicon Gate CMOS process. It has a 4096 by 1 memory configuration, and 250ns access time, interfaces with a number of microprocessors, and is pin-compatible with the industry standard 6505. These devices are ideal for nonvolatile storage with battery backup. Each device is powered from a single +5V supply. Data is retained even when power drops to as low as 2V. The absolute maximum voltage of 7 volts allows for four, fully-charged, 1.5V batteries in portable product applications. The 100-piece price is \$6.25. Micro Power Systems, 3100 Alfred St., Santa Clara, CA 95050, (408) 247-5350.

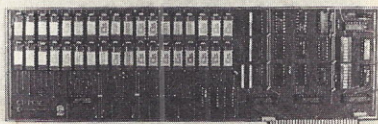
CIRCLE INQUIRY NO. 271

Synergizer provides Apple users with advanced capabilities: CP/M compatibility, expanded RAM, 80-column display, and increased word processing software compatibility. It consists of a powerful implementation of the CP/M operating system and three peripherals: Smarterm, a powerful 80-column display board; Z-Card, ALS's Z-80A processor for the Apple to provide the full range of CP/M capabilities for both the Apple II and Apple III; and Add-Ram, the 16K RAM board that permits addressing of the full memory supported by the Z80A processor (and the 6502 in the Apple). Price: \$749. ALS, 1195 E. Arques Ave., Sunnyvale, CA 94086, (408) 727-6805.

CIRCLE INQUIRY NO. 272

Memory module, CI-PCM, was designed using 64K-bit NMOS dynamic RAM technology. The module requires only one I/O expansion slot for 256K bytes of memory. The CI-PCM generates and checks parity with Interrupt totally IBM-

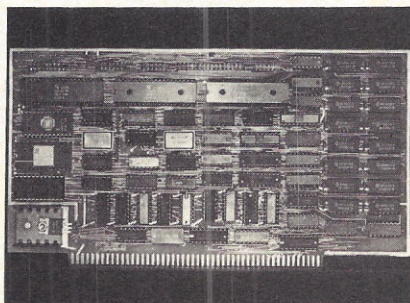
compatible. It is addressable in 64K-byte increments throughout the 1M-byte address field of the IBM Personal Computer. The



memory has an access time of 225 nS and a cycle time of 400 nS with a totally current requirement of under 1 amp from the system 5 volt power supply. It is available in 64K, 128K, 192K, and 256K-byte configurations. Delivery is stock. Price: \$1,150 for the 256K-byte option. Chrislin Industries, 31352 Via Colinas #102, Westlake Village, CA 91361, (213) 991-2254.

CIRCLE INQUIRY NO. 273

I/O board, SBC-I, contains a CPU, two serial ports, two parallel ports, and 128K bytes of user RAM all on one IEEE S-100 unit. Capable of operating as a slave on the S-100 bus in a high performance multi-processing system, the board can also be implemented as a stand-alone single board computer in a network environment. Because each user has his own CPU, the addition of other users in the system causes far less speed degradation than in currently available timesharing multi-user systems. SBC-I has memory management hardware that allows the on-board Z-80A (optionally Z-80B) to directly address 128K bytes in 4K segments. This circuit opens up a wide world of possibilities in operating systems and applications software. In addition to user RAM, there is provision for up to 8K of on-board EPROM to be used for initialization routines. The 2716/32/64 device can be disabled by software after the initialization process is completed. The S-100 bus interface is via a 1K or 2K-byte



FIFO allowing efficient communication to the system master. SBC-I appears as a set of I/O ports to the bus master and is fully IEEE-696 S-100 compatible. The two serial ports allow full RS-232C compatible communication up to 19,200 baud or optionally a high speed RS-422 interface. In addition, the interface for a synchronous modem has been provided. Teletex, 9767F Business Park Dr., Sacramento, CA 95827, (916) 361-1777.

CIRCLE INQUIRY NO. 274

CP/M® SOFTWARE

NEW PRICES NEW SOFTWARE For The Small Computer System

ACCOUNTING

GENERAL LEDGER	IMS	\$540	\$40 1.7
ACCOUNTS RECEIVABLE (B/F)	IMS	540	40 1.7
ACCOUNTS RECEIVABLE (O/I)	IMS	540	40 1.7
ACCOUNTS PAYABLE	IMS	540	40 1.7
PAYROLL	IMS	540	40 1.7
JOB ACCOUNTING	IMS	540	40 1.7
FUND ACCOUNTING	IMS	540	40 1.7
CASH RECEIPT DISBURSEMENT	IMS	200	40 1.7
DEPRECIATION SCHEDULE	IMS	100	40 1.7

GENERAL BUSINESS SYSTEMS

MFG. INVENTORY CONTROL	IMS	\$600	\$75 1.7
WHOLESALE/RETAIL DISTRIBUTION	IMS	600	75 1.7
MEDICAL/DENTAL SYSTEM	IMS	600	75 1.7
STUDENT RECORDS/SCHEDULING	IMS	540	50 1.7
PROPERTY MANAGEMENT	ASC	1095	75 1.7, 12
PROPERTY MANAGEMENT	A-T	640	50 1.7
PROPERTY ANALYSIS SYSTEM	A-T	245	50 1.7
INSURANCE AGENCY SYSTEM	Univar	940	75 1.7, 9
MONEY MAESTRO-HOME BANKING	InnoSys	190	25 1
WIREMASTER	Afterthought Eng.	140	25 2.17

MODELING, PLANNING & ANALYSIS

MINI MODEL™	Financial Plan Assoc.	\$490	\$60 1.7
STATPAK	Northwest Analytical	490	50 1.8
SHORTAX	Syntax	490	40 2.5, 8
MICROSTAT	Ecosoft	290	25 15
SUPERCALC™	Sorcom	285	— 1.6
CALCSTAR™	Micro-Pro	250	60 5
muSIMP/muMATH	Microsoft	245	30 2.5
WORKSHEET	SoHo Group	200	30 1.9, 7 or 8
TARGET™ PLANNER	AMS	195	50 4.5
FORECASTER	Software Establishment	145	45 2.5, 7.9

TIME, BILLING & SCHEDULING

LEGAL TIME ACCOUNTING	Univar	\$945	\$60 1.7, 9
LEGAL BILLING & TIMEKEEPING	Microcraft	650	60 1.7, 9
PROFESSIONAL TIME ACCOUNTING	Asyst	590	40 1.7, 9
CLIENT BILLING	Serendipity	590	40 1.4, 7.9
DATEBOOK II™	Organic Software	290	40 1.9
MILESTONE™	Organic Software	290	40 1

LANGUAGES

μAPl	Softtronics	\$345	\$50 2.5
BASIC COMPILER	Microsoft	350	— 2.5
BASIC - 80	Microsoft	325	— 2.5
S - BASIC™	Topaz	290	35 2
CBASIC - 2™	Digital Research	120	35 5
CB80™	Digital Research	490	35 5
CBASIC/86™	Digital Research	325	35
TINY C - II	Tiny C Assoc.	245	50 2.5, 13
TINY C	Tiny C Assoc.	100	50 2.5, 13
C-COMPILER	Supersoft	195	25 2.5
COBOL - 80	Microsoft	690	— 2.5
NEVADA COBOL	Elis	190	30 2.5
FORTH	Supersoft	195	30 2.5, 12
FORTH (Z80)	Lab. Microsystems	45	25 2.6
FORTHAN - 80	Microsoft	430	— 2.5
FORTHAN IV	Supersoft	245	30 2.5, 17
RATFOR	Supersoft	95	— 13
muLISP/muSTAR-80	Microsoft	200	— 2.5
TINY PASCAL	Supersoft	80	15 2.5
PASCAL Z	Itasca	390	40 3.17
PASCAL/MT+™	Digital Research	485	60 3.6
PASCAL/M™	Sorcom	370	35 3.12
PL/I - 80™	Digital Research	490	50 2.6

MAILING LIST

POSTMASTER	Teratek	\$145	\$25 2.5, 7
MAIL - MERGE™ FOR WORDSTAR	Micropro	130	30 5.7
NAD	Structured Systems Group	110	25 2.5, 9, 19
SUPER - M - LIST	Supersoft	100	25 2

TELECOMMUNICATIONS

ASCOM	DMA	\$170	\$25 9
TERM	Supersoft	145	25 2.13
COMPAC™	Far North Systems	100	20 5

ENTERTAINMENT

NEMESIS	Supersoft	\$40	\$15 2.5, 10
ANALIZA II	Supersoft	50	— 2.6, 7

ORDER INFORMATION

- CALL TOLL FREE 800 538-3160
- CALIF (408) 996-8560
- OVERSEAS AND C.O.D. — ADD \$10 + SHIPPING-HANDLING
- SHIPPING-HANDLING — ADD \$3.00 PER ITEM
- CALIF. RESIDENTS — ADD 6-1/2% SALES TAX
- PAYMENT — PREPAY, CHECK, MONEY ORDER, UPS C.O.D.
- ALL ITEMS SUBJECT TO AVAILABILITY
- ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE
- ALL ORDERS SHIPPED UPS, F.O.B. SAN JOSE
- MOST DISK FORMATS AVAILABLE
- MANUAL ORDERS WILL BE APPLIED TO SOFTWARE PURCHASES WITHIN 90 DAYS
- THE SALE OF EACH SOFTWARE CONVEYS A LICENSE FOR USE ON ONE SYSTEM ONLY

COMPLETE
MANUAL
ONLY
SYSTEM
REQUIRE-
MENTS

*** DISCOUNTS ***

- IMS CHECKED (.) ITEMS — BUY TWO
- CHOOSE A THIRD ONE FREE
- CHOOSE 1 BOOK LISTED FOR EACH ITEM
- ORDERED OVER \$200

WORD/TEXT PROCESSING

SPELLBINDER™	Lexisort	\$490	\$50 2.5, 9, 14
BENCHMARK™	Metasoft	480	— 2.6
WORDSTAR™	Micropro	440	60 5.9, 10
SPELLGUARD™	ISA	285	25 2.5, 14
SPELLSTAR	Micropro	240	30 5.14
MINCE	Unicom	140	30 2.5, 10
SCRIBBLE	Unicom	140	30 3.5, 10
WORDMASTER	Micro-Pro	130	40 5.10
TEXTWRITER III™	Organic Software	120	40 2.5, 14
TEX	Digital Research	100	20 5

DATA/FILE MANAGEMENT

FMS-80	System Plus	\$975	\$60 1.9
CONDOR - II	Condor Computer	940	50 1
ACCESS/80	Friends Software	780	50 3.5
DBASE II	Ashton-Tate	680	50 1.9
PEARL 3	Computer Pathways	540	50 2.7, 19
SELECTOR V	Micro-Ap	485	50 1.3, 10
T.I.M. III	Innovative Software	640	50 1.15
DATASTAR™	Micropro	340	60 5.10
SELECTOR IV™	Micro-Ap	285	50 1.3, 10
MICRO B +	Far Com	255	30 3.16
ANALYST	Structured Systems Group	240	25 1.7, 9
BT-80™	Digital Research	200	30 6
FABS	Computer Control	190	25
WHATSIT?™	Computer Hardware	170	30 2.5, 7

SOFTWARE DEV TOOLS/UTILITIES

ZSID	Digital Research	\$100	\$25 5
MAC	Digital Research	90	25 5
SID	Digital Research	75	25 5
DESPOOL	Digital Research	50	— 5
XL86™	Digital Research	150	15
MACRO - 80	Microsoft	195	— 2.5
EDIT - 80	Microsoft	110	— 2.5
IBM2CPM	Precision Comp. System	100	— 2.5
VEDIT	CompuView Products	140	30 2.5
DISK DOCTOR	Supersoft	95	20 2
DIAGNOSTIC II	Supersoft	95	25 2
FILE INDEX	Fisher	25	—

SORTING

SUPERSORT™	Micropro	\$220	\$60 5
ULTRASORT II™	Computer Control	150	25 7
QSORT	Structured Systems Group	95	25 2.5

CP/M

CP/M 2-TRS 80 MODEL II™	P&T	\$185	\$40
CP/M — TRS 80 MODEL III™	Far North Systems	250	40 2.11
CP/M Z80 APPLE SOFTCARD	Microsoft	335	— 2

BOOKS

CP/M HANDBOOK	Sybox	\$14.95
CP/M USERS GUIDE	Osborne	12.99
CP/M PRIMER	Sams	11.95
HOW TO GET STARTED WITH CP/M	Dillithium	10.95
USING CP/M - SELF TEACHING	Wiley	10.95
CP/M SUMMARY GUIDE	Rainbow	6.95
MICROSOFT BASIC	Dillithium	12.95
FIFTY BASIC EXERCISES	Sybox	12.95
BASIC PRIMER	Sams	10.95
BASIC BUSINESS SOFTWARE	Sams	9.95
MICROSOFT FORTRAN	Dillithium	15.95
PASCAL PRIMER	Sams	16.95
PASCAL HANDBOOK	Sybox	14.95
PASCAL USERS MANUAL AND REPORT	Jenson-Wirth	14.95
INTRO TO PASCAL	Sybox	14.95
PROGRAMMING THE Z80	Sybox	15.95
YOUR FIRST COMPUTER	Sybox	8.95

SYSTEM REQUIREMENTS—All software requires a CP/M operating system as well as indicated requirements listed below:

1. RECOMMENDED SYSTEM—CP/M 1.4 OR HIGHER, 48K
2. 48K MEMORY OR HIGHER
3. 56K MEMORY OR HIGHER
4. 64K MEMORY OR HIGHER
5. CP/M 1.4 OR HIGHER
6. CP/M 2.0 OR HIGHER
7. CBASIC-2
8. BASIC-80 (MBASIC) 4.51
9. SIGNED LICENSE REQUIRED BEFORE SHIPMENT
10. CURSOR ADDRESSABLE TERMINAL
11. REQUIRES NO HARDWARE MODS
12. SPECIFY Z80, 8080, OR CDOS
13. SUPPLIED IN SOURCE CODE
14. COMPATIBLE WORD/TEXT PROCESSOR
15. BASIC-80 (MBASIC) 5.0 OR HIGHER
16. MUST SPECIFY HOST APPLICATION LANGUAGE
17. REQUIRES Z80 CPU
18. PRICE INCLUDES TWO CONFIGURATIONS
19. MAY REQUIRE ULTRASORT OR QSORT

CP/M IS A REGISTERED TRADEMARK OF DIGITAL RESEARCH
Z80 IS A REGISTERED TRADEMARK OF ZILOG INC.
TRS 80 MODEL II IS A REGISTERED TRADEMARK OF TANDY CORP.
™ DESIGNATES NAME IS TRADEMARKED BY MFG.

CORNERSTONE SOFTWARE

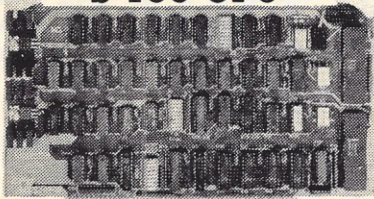
PO BOX 5151 • SAN JOSE, CA 95150

TOLL FREE 800 538-3160 CALIF (408) 996-8560

DEALER INQUIRES INVITED

COPYRIGHT © 1981 CORNERSTONE SOFTWARE

ALL RIGHTS RESERVED

1
ONE**S-100 CPU****CPU-Z - GODBOUT**

2/4 MHZ Z80 CPU 24 Bit Addressing

PART NO.	DESCRIPTION	LIST PRICE	OUR PRICE
IGBT160A	A & T.....	\$295.00	\$199.00
IGBT160C	CSC 3-6 MHZ.....	\$395.00	\$375.00

DUAL PROCESSOR 8085-8088 - GODBOUT

6 or 8 MZ Provides true 16 Bit Power with a standard 8 bit S-100 bus.

IGBT1612A	A & T 6 MHZ.....	\$425.00	\$399.00
IGBT1612C	CSC 6/8 MHZ.....	\$525.00	\$498.00

SOLID STATE DISK DRIVE, 3500% FASTER!

Not Really, But the Next Best Thing For Godbout 8085/88 Users. Call for Details on M-Drive. See Page 340 of November BYTE

IGBT MD 128K	\$1,550.00	
IGBT MD 256K	\$3,000.00	

2810 Z80 CPU-CA. COMP. SYST.

2/4 MHZ Z80A CPU with RS232C Serial I/O Port complete with Monitor PROM for 2422 Disk Controller

ICCS 2810A	A & T.....	\$350.00	\$280.00
------------	------------	----------	----------

CB2 Z80 CPU - S.S.M.

2/4 MHZ will accept 2716, or 2732, or RAM RUN/STOP and single step switches

ISSMBC2K	Kit.....	\$260.00	
ISSMBC2A	A & T.....	\$344.00	\$310.00
ISSMZ80M	SSMZ80 Monitor.....	\$89.00	

CB1A 8080 CPU - S.S.M.

8080 CPU, 1K RAM, Holds 1 2708, 1 Bit parallel input port.

ISSMBC1K	Kit.....	\$183.00	
ISSMBC1A	A & T.....	\$252.00	\$225.00
ISSM8080M	SM 8080 Monitor.....	\$59.00	

S-100 I/O BOARDS**SYSTEM SUPPORT 1 - GODBOUT**

Serial port (software prog baud), 4K EPROM OR RAM provision, 15 levels of interrupt, real time clock, optional math processor

PART NO.	DESCRIPTION	LIST PRICE	OUR PRICE
IGBT162A	Assembled & Tested	\$399.00	\$360.00
IGBT162C	CSC	\$495.00	\$460.00
IGBT8231	Math Chip		\$195.00
IGBT8232	Math Chip		\$195.00
IGBT162AM1	A&T with 8231 Math Chip		\$555.00
IGBT162CM1	CSC with 8231 Math Chip		\$655.00
IGBT162AM2	A&T with 8232 Math Chip		\$555.00
IGBT162CM2	CSC with 8232 Math Chip		\$655.00

MPX CHANNEL BOARD - GODBOUT

I/O Multiplexer, using 8085A-2 CPU on board

IGBT166A	A & T.....	\$495.00	\$450.00
IGBT166C	CSC	\$595.00	\$550.00

INTERFACER I - GODBOUT

Two Serial I/O

IGBT133A	A & T.....	\$249.00	\$219.00
IGBT133C	CSC	\$324.00	\$298.00

INTERFACER II - GODBOUT

Three parallel, one serial I/O board

IGBT150A	A & T.....	\$249.00	\$219.00
IGBT150C	CSC	\$324.00	\$298.00

INTERFACER III - GODBOUT

Eight channel multi-use serial I/O board

IGBT1748A	A & T.....	\$699.00	\$629.00
IGBT1748C	CSC 200 hr. Burn In	\$849.00	\$750.00

INTERFACER 3 WITH 5 SERIAL PORTS

IGBT1745A	A & T.....	\$599.00	\$559.00
IGBT1745C	CSC 200 hr. Burn In	\$699.00	\$629.00

MULTI I/O - MORROW DESIGNS

Three Serial, Two parallel

IDMSMB3200	A & T.....	\$359.00	\$329.00
------------	------------	----------	----------

SWITCHBOARD - MORROW DESIGNS

Two serial I/O, four parallel I/O,

one status port, one strobe port

IDMSB2411	\$299.00	\$269.00
-----------	-------	----------	----------

I/O4 - SSM

Two serial I/O, two parallel I/O

ISSMI04K	Kit.....	\$210.00	
ISSMI04A	A & T.....	\$290.00	\$260.00

I/O 5 - SSM

2 Serial, 3 Parallel including 1 Centronics

ISSMI05I	A & T.....	\$329.00	\$309.00
----------	------------	----------	----------

I/O 8 - SSM

8 Port Serial I/O with Timer

ISSMI08A	A & T.....	\$550.00	\$495.00
----------	------------	----------	----------

2710 4 PORT SERIAL - CCS

ICCS271001	A & T.....	\$360.00	\$310.00
------------	------------	----------	----------

2718 2 SERIAL & 2 PARALLEL - CCS

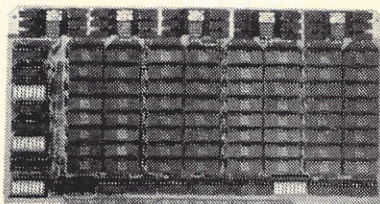
ICCS271801	A & T.....	\$360.00	\$325.00
------------	------------	----------	----------

2720 4 PORT PARALLEL - CCS

ICCS272001	A & T.....	\$250.00	\$225.00
------------	------------	----------	----------

S-100 10 MHZ STATIC RAM

NEW LOW PRICES!

**RAM 20 - 32K
SALE \$299.00****32K STATIC RAM - GODBOUT**

RAM 20 10 MHZ, 4K byte block disable, bank select or 24 bit addressing available 8, 16, 24 or 32K

PART NO.	DESCRIPTION	LIST PRICE	OUR PRICE
IGBT164AA8	8K A&T	\$210.00	\$190.00
IGBT164AC8	8K CSC	\$280.00	\$260.00
IGBT164AA16	16K A&T	\$285.00	\$260.00
IGBT164AC16	16K CSC	\$355.00	\$325.00
IGBT164AA24	24K A&T	\$355.00	\$325.00
IGBT164AC24	24K CSC	\$425.00	\$385.00
IGBT164AA32	32K A&T	\$425.00	\$299.00
IGBT164AC32	32K CSC	\$495.00	\$450.00

CMOS STATIC RAM

For a complete analysis of the advantages of CMOS memory, see the "Product Description" on page 416 of the January Issue of BYTE.

64K CMOS STATIC RAM - GODBOUT

RAM 17, 10 MHZ, 2 Watt, DMA Compatible

PART NO.	DESCRIPTION	LIST PRICE	OUR PRICE
IGBT175A48	48K A&T	\$650.00	\$619.00
IGBT175C48	48K CSC 200hr.	\$750.00	\$710.00
IGBT175A64	64K A&T	\$795.00	\$755.00
IGBT175C64	64K CSC 200hr.	\$895.00	\$850.00

NEW! 32K x 16 BIT CMOS STATIC RAM - GODBOUT

RAM 16 10 MHZ, 32K x 16 or 64K x 8

IGBT180A	64K A&T	\$895.00	\$850.00
IGBT180C	64K CSC	\$995.00	\$945.00

NEW! 128K NMOS STATIC RAM - GODBOUT

RAM 21 10MHZ 128K X 8 OR 64K X 16

IGBT167A	128K A&T	\$1695.00	\$1610.00
IGBT167C	128K CSC	\$1895.00	\$1795.00

S-100 PROM**PBI PROM PROGRAMMER - SSM**

Programs 2708 or 2716's, operates as a 4K/8K EPROM BOARD AS WELL.

ISSMPB1K	Kit	\$179.00	
ISSMPB1A	A & T	\$265.00	\$220.00

ECONOROM 2708 - GODBOUT

16K x 8 EPROM Board using 2708, Power on jump to any 256 byte

IGBT125A	A & T	\$135.00	\$120.00
IGBT125C	CSC	\$195.00	\$175.00

MB8A - SSM

1K/16K 2708 EPROM board, disable in 1K increments

ISSMMB8AK	Kit	\$114.00	
ISSMMB8AA	A & T	\$179.00	\$159.00

S-100 VIDEO BOARDS**SPECTRUM - GODBOUT**

Color Graphics board with Parallel I/O

IGBT144A	A & T	\$399.00	\$349.00
IGBT144C	CSC	\$449.00	\$399.00
IGBT20	Sublogic Universal Graphics Interpreter Software		\$35.00

VB - 3 S.S.M.

80 x 25 or 50 character video display Memory

ISSMVB3K24	80 x 24 Kit	\$425.00	
ISSMVB3A24	80 x 24 A&T	\$499.00	\$440.00
ISSMVB3UP	80 x 50 Line Upgrade		\$39.00

VB2-S.S.M.

I/O Mapped Video Board, with Parallel Keyboard port

ISSMVB2K	Kit	\$199.00	
ISSMVB2A	A & T	\$269.00	\$229.00

VBBB - S.S.M.

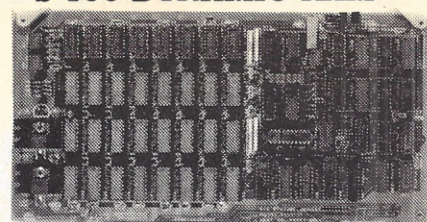
Memory Mapped Video Board 64 x 16 character

ISSMVB1K	Kit	\$179.00	
ISSMVB1A	A & T	\$242.00	\$220.00

S-100 MOTHERBOARDS - GODBOUT

Active termination, 6-12-20 slot

IGBT153A	A&T 6 slot, 2 lbs	\$140.00	\$126.00
IGBT153C	CSC 6 slot, 2 lbs.	\$190.00	\$175.00
IGBT154A	A&T 12 slot, 3 lbs.	\$175.00	\$155.00
IGBT154C	CSC 12 slot, 3 lbs.	\$240.00	\$220.00
IGBT155A	A&T 20 slot, 4 lbs.	\$265.00	\$235.00
IGBT155C	CSC 20 slot, 4 lbs.	\$340.00	\$310.00

S-100 DYNAMIC RAM**THE EXPANDABLE 1****PRIORITY 1 ELECTRONICS**

THE EXPANDABLE 1" 64K Dynamic Ram board provides your S-100 system with 64K of reliable, high-speed dynamic RAM. Compatible with most of the major S-100 systems on the market, including those with front panels, it supports DMA operations and requires no Wait states with current microprocessors.

- User expandable from 16 to 64K
- Supports DMA
- Designed to IEEE proposed S-100 bus standards • 2 or 4 MHz operation
- Operates with either an 8080 or Z-80 based S-100 system, providing processor-transparent refreshes with both
- Supports IMSA-type front panels
- Jumper-selectable Phantom input
- Uses Popular 4116 RAMS
- All ICs in sockets
- Any 16K block can be made bank-independent
- Fully buffered address and data lines
- Fail-safe refresh circuitry for extended Wait states
- Board configuration with reliable, easy-to-configure Berg jumpers

IDPRIEXP116	16K Assembled & Tested	\$299.00	
IDPRIEXP132	32K Assembled & Tested	\$339.00	
IDPRIEXP148	48K Assembled & Tested	\$379.00	
IDPRIEXP164	64K Assembled & Tested	\$409.00	

S-100 DISK CONTROLLERS**2422A - CA. COMP. SYST.**

I/O Mapped, controls 8", single or double density A&T with CPM 2.2 8" S.D.

PART NO.	DESCRIPTION	LIST PRICE	OUR PRICE
IDCCS2422A	\$475.00	\$375.00

DISK JOCKEY 2D - MORROW

Memory Mapped, controls 8", single or double density, serial I/O

IDMDIDJ2208	A&T with CP/M 2.2	\$399.00	\$375.00
-------------	-------------------	----------	----------

S-100 DISK SUBSYSTEMS**DJ2B DISCUS SINGLE SIDED MORROW**

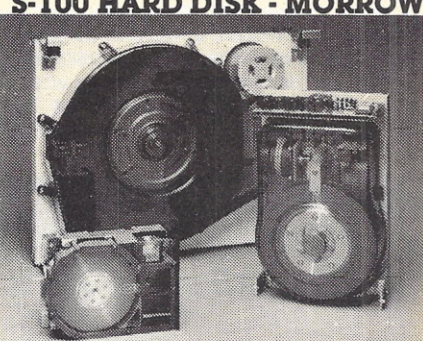
8" DBL Density drives with cabinet, power supply controller, with CP/M 2.2 and Microsoft Basic

IDMDSF1218	Single Drive System	\$1095.00	\$950.00
IDMDSF1228	Dual Drive System	\$1875.00	\$1598.00

DJ2B DISCUS DOUBLE SIDED - MORROW

8" DBL Density/sided drives with cabinet Power supply controller, with CP/M 2.2 and Microsoft Basic

IDMDSF2218	Single Drive System	\$1395.00	\$1250.00
IDMDSF2228	Dual Drive System	\$2495.00	\$2050.00

S-100 HARD DISK - MORROW

5.25" 5MB, 8" 10 & 20MB, 14" 26MB formatted hard disk complete with cabinet, P.S., Controller, CP/M 2.2 and Microsoft MBASIC 80

PART NO.	DESCRIPTION	LIST PRICE	SALE PRICE
IDMDSMAM5	5 MB	\$2495.00	\$1995.00
IDMDSM10S	10 MB	\$3695.00	\$2950.00
IDMDSM20S	20 MB	\$4795.00	\$3825.00
IDMDSM26S	26 MB	\$4495.00	\$3495.00

VIDEO MONITORS**VM121 - ZENITH**

15 MHz 12" P31 Green phosphor 40 or 80 characters per line

IDZENVM121	20 lbs.	\$159.00	\$139.00
------------	---------	----------	----------

VM4509 - SANYO

10MHz, 9" 16 x 64 P4 B&W monitor

IDSYOVM4509	15 lbs.	\$235.00	\$198.00
-------------	---------	----------	----------

DM5012 - SANYO

18MHz, 12" 24 x 80 P4 B&W monitor

IDSYOVM5012	24 lbs.	\$340.00	\$310.00
-------------	---------	----------	----------

DM5112 - SANYO

18MHz, 12" 24 x 80 P31 Green on Black display

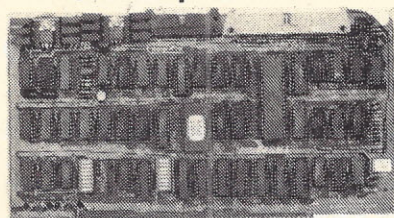
IDSYOVM5112	24 lbs.	\$360.00	\$325.00
-------------	---------	----------	----------

VM6013 - SANYO

COLOR 13" 16 line x 64 character monitor

IDSYOVM6013	35 lbs	\$550.00	\$495.00
-------------	--------	----------	----------

GODBOUT DMA DISK 1 WITH FREE CPM 2.2 SALE \$450.00



SAVE \$220.00

Priority 1 Electronics is pleased to offer the GODBOUT DISK 1 High Performance Disk Controller at our regular low price with CP/M 2.2 and BIOS at no additional cost. That's a savings of \$220.00 of the manufacturer's list price.

- Third generation INTEL 8272/NEC 765A LSI floppy disk controller.
- High speed cycle stealing DMA interface for processor independent data transfer between system memory and flexible disk.
- Handles up to four 8 or 5.25 inch floppy disk drives
- Single or double density/single or double sided capability.
- Supports IBM 3740 soft sector formats.
- 24 bit DMA addressing with data transfer across 64K boundaries for data transfer throughout the 16Mbyte memory map.

PART NO.	DESCRIPTION	LIST PRICE	OUR PRICE
IDPB171ACPM	A&T w/CP/M 2.2 & BIOS	\$670.00	\$450.00
IDGB171C	CSC	\$595.00	\$555.00
IDGBTCPMB0*	CP/M 2.2 for Z80/8085 with manuals & BIOS 8" S/D disk		\$175.00
IDGBTAS8S	Oasis 8 bit single user 8" S/D disk		\$500.00
IDGBTAS8M	Oasis 8 bit multiuser, 8" S/D disk		\$850.00

S-100 SYSTEMS

SUPERSIXTEEN - GODBOUT

HERE IS WHAT EACH PACKAGE INCLUDES:

- IDGBT1612A 6 MHz 8085/8088 Dual Processor Board
 - IDGBT171A High Speed DMA Disk Controller
 - IDGBT162A System Support 1 Multi-Function Board
 - IDGBT133A Interfacer 1 Dual Serial I/O
 - ID128K 128KHz Low Power Static Ram
 - IDGBTCPMB 86 16 Bit Operating System Ready to Load & Go
- Cables and Documentation Three interfacers cables one disk I/O cable, complete documentation for all hardware, and manuals for both CP/M operating systems.

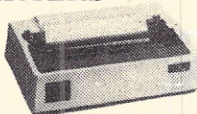
Compu Pro's famous 1 Year limited warranty.

Now to the best part of all. If purchased separately, these quality components would list for \$4,344.00. BUT SuperSixteen's low package price is an amazing \$3,495.00. You save \$849.00! For boards qualified under the Certified System Component high-reliability program - with extended 2 year warranty, 200 hour burn-in and 8 MHz processors - add \$600.00 to the package price.

IDPBB8TSJ	SuperSixteen A&T	\$3495.00
IDPBB8TSK	SuperSixteen CSC	\$4095.00

PRINTERS

**BEST
PRICE!**



MICROLINE - OKIDATA WITH FRICTION AND TRACTOR FEED

- BI-DIRECTIONAL - 120 CPS
- 9x9 Matrix (Alphanumeric)
- 6x9 or 12 Matrix for Graphics
- 5,8,9, 10, 16 Characters p/Inch
- 6 or 8 Lines per Inch
- 80 CPL @ 10 CPI for 82A
- 132 CPL @ 10 CPI for 83A
- Parallel and Serial I/O
- 100 Thru 1200 Baud
- Self Test
- Out of Paper Switch
- Friction or Tractor Feed
- 3" to 14" Top of Form (Switch Selectable)
- 10 Different Character Sets

PART NO.	DESCRIPTION	LIST PRICE	SALE PRICE
IDOKIDAT82AT26	80 CPL @ 10 CPI \$ 799.00		\$539.00
IDOKIDAT83AT	(37 lbs) 132 CPL @ 10 CPI \$ 1195.00		\$750.00
IDOKISER2KBF	9600 baud with 2K Serial Buffer upgrade with X-on Y-off		\$159.00
IDOKIGRAPH	High Resolution Graphics Prom		\$99.00

CALL FOR THE NEW MICROLINE 84

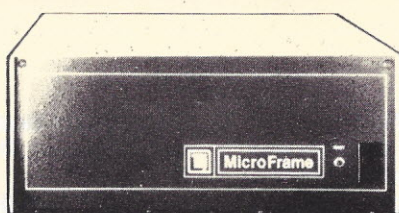
MX80 - EPSON

NEED WE SAY MORE?

IDEPNMX80	Tractor Feed 17 lbs	\$645.00	\$450.00
PRINTER INTERFACES - MICROBYTE			
IDMBSSEI1	A & T RS232 Serial Conversion for MX80		\$55.00
IDMBSSEI1	Apple Centronics 8 bit parallel interface for Centronics, Epson & OKIDATA printers		\$55.00
IDMBSAEC1	A & T Cable for above		\$14.95

Printer interfaces & cables sold only with printer purchase

S-100 MAINFRAMES



S-100 MICROFRAME - TEI

110V 60HZ CVT Mainframes, the best money can buy!
12 Slot $\pm 8V$ 17A $\pm 16V$ @ 2A
22 Slot $\pm 8V$ @ 30A $\pm 16V$ @ 4A

PART NO.	DESCRIPTION	LIST PRICE	OUR PRICE
IDTEIMCS 112	12 Slot Desk	\$685.00	\$570.00
IDTEIMCS 122	22 Slot Desk	\$825.00	\$705.00
IDTEIRM 12	12 Slot Rackmount	\$725.00	\$619.00
IDTEIRM 22	22 Slot Rackmount	\$875.00	\$750.00

Shipping Weight: On 12 Slot Mainframe 45 lbs.
On 22 Slot Mainframes 55 lbs.

TEI S-100 FRAMES

3 - 5" DISK CUTOUTS

$\pm 8V$ @ 17 $\pm 16V$ @ 1.2A, Internal Cables

PART NO.	DESCRIPTION	LIST PRICE	OUR PRICE
IDTEITF12	12 Slot desk	\$675.00	\$580.00
IDTEIRF12	12 Slot Rackmount	\$795.00	\$665.00

Shipping Weight: On 12 Slot Desk 40 lbs.
On 12 Slot Rackmount 45 lbs.

DUAL 8" DISK DRIVE CHASSIS - TEI

For Shugart 800/801R or 850/851R with internal power cables provided
+24V @ 1.5A +5V @ 1.0A -5V @ .25A

PART NO.	DESCRIPTION	LIST PRICE	OUR PRICE
IDTEIDF00	Desk Top	\$535.00	\$485.00
IDTEIRF00	Rack Mount	\$720.00	\$630.00
IDPDBDF00S1	DFDO with 1 Shugart 801R		\$5970.00
IDPDBDF00S2	DFDO with 2 Shugart 801Rs		\$1375.00
IDPDBRF00S1	RFDO with 1 Shugart 801R		\$1095.00
IDPDBRF00S2	RFDO with 2 Shugart 801Rs		\$1495.00
IDPRI50PGCE2	Internal Data Cable .50 pin plug connector to 2 Card Edge		\$34.95

Due to UPS shipping regulations, disk drives will be shipped separately from the cabinet. Don't forget to include shipping for each drive. (Shipping Weight, 16 lbs each.)

CALL FOR NEW TEI PRICES MARCH 1st

S-100 MAINFRAME - GODBOUT

110V 60HZ CVT Mainframe uses famous 20 slot GODBOUT Motherboard. 55 lbs.
IDGBTENC20RM 20 Slot Rack Mount \$895.00 \$825.00
IDGBTENC20DK 20 Slot Desk Top \$825.00 \$760.00

S-100 MAINFRAME - CCS

12-slot motherboard with removable termination card
IDCCS220001 Office Cream 35 lbs \$575.00 \$535.00
IDCCS220002 Blue 35 lbs \$575.00 \$535.00

SOFTWARE - MICROPRO

All software is supplied on 8" Single Density IBM 3740 CP/M Compatible Diskettes

WORDSTAR

Screen-Oriented, integrated word processing system specifically designed for non-technical personnel
IDMPRWDRSTAI \$495.00 \$300.00

MAIL MERGE WORD STAR OPTION

Powerful file merging tool
IDMPRMLMRGA1 (Requires Word Star 2.1 or later) \$250.00 \$100.00

SPELLSTAR WORD STAR OPTION

One Step "Proofreader" with compressed 20,000 word dictionary and user-created supplemental dictionaries
IDMPRSPLSAT1 (Requires Word Star 3.0 or later) \$250.00 \$150.00

SUPERSORT

Sophisticated program that will select and re-arrange variable length information from data files
IDMPSPRSRA1 \$250.00 \$150.00

CALC STAR

Sophisticated, easy-to-use, electronic spread sheet and financial planner
IDMPRLCSAT1 \$295.00 \$200.00

DATA STAR

Office-Oriented Data Entry, retrieval, and updating system
IDMPDATSAT1 \$350.00 \$200.00

CIRCLE INQUIRY NO. 105



PRIORITY ONE ELECTRONICS

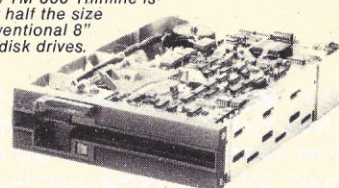
9161-I DEERING AVE • CHATSWORTH, CA 91311

ORDER TOLL FREE (800) 423-5922 CA, AK, HI CALL (213) 709-5464

Terms U.S. VISA, MC, BAC, Check, Money Order, U.S. Funds Only. CA residents add 6% Sales Tax. MINIMUM PREPAID ORDER \$15.00. Include MINIMUM SHIPPING & HANDLING CHARGE \$3.50 for the first 3 lbs. plus .25¢ for each additional pound. Orders over 50 lbs. sent freight collect. Just in case, please include your phone no. Prices subject to change without notice. We will do our best to maintain prices through April 1982. Credit Card orders will be charged appropriate freight. See November BYTE for 60 page Catalog or send \$1.00 for your copy today. Sale prices are for prepaid orders only.

FLOPPY DISC DRIVES

Tandon TM-800 Thinline is exactly half the size of conventional 8" floppy disk drives.



Exactly one-half the height of any other model. Proprietary, high-resolution, read-write heads patented by Tandon. D.C. only operation - no A.C. required. Industry standard interface.

Three millisecond track-to-track access time 9 lbs.
IDNTMTM8461 Single Sided \$495.00 2 or more \$470.00
IDNTMTM8462 Double Sided \$825.00 2 or more \$600.00
IDNTMTM8M Manual - not included with drive \$ 10.00

801R - SHUGART

Single sided double density most popular 8" drive
IDSHU801R \$425.00 ea or 2 or more (16 lbs) for \$395.00 ea.
IDSHUS801RM Manual for 801R drives \$ 10.00

DT-8 - QUME

**2 OR
MORE
\$499.00**

Data track 8 double sided, double density 8" Sh. Wt. 16 lbs \$525.00 ea.

2 or more \$499.00 each
IDQMEDT8M Manual for DT-8 \$ 10.00

5 1/4" DRIVES - TANDON
IDNTMTM1001 Single Sided, 250KB (5 lbs) \$310.00
IDNTMTM1002 Double Sided, 500KB \$370.00
IDNTMTM1003 Single Sided, 500KB \$375.00
IDNTMTM1004 Double Sided, 1000KB \$495.00
IDNTMTM5M Manual, not included with drive \$ 10.00

DISK CABINETS



V-100 - VISTA

• Desk or rack mountable • Internal power and data cables
• Drives pull out for easy service and maintenance
IDVISV100 Disk Drive Cabinet (43 lbs) \$495.00 \$449.00

SINGLE 8" - Q.T.

Single 8" cabinet with power supply (22 lbs) \$249.00 \$225.00

DUAL 8" - Q.T.

Dual 8" cabinet with power supply (24) \$395.00 \$349.00

5" CABINETS - VISTA

Single 5" with P.S. \$75.00
Dual 5" with P.S. \$95.00

TERMINALS



VT200 - VISUAL TECHNOLOGY

THE MOST RELIABLE TERMINAL WE'VE EVER USED!

Detachable keyboard, RS232C or 20MA interface, 110 to 19200 baud, 12" non glare 80 x 24 display, RS232 Aux. port and composite video out.
IDVSL200 Shipping Weight 50 lbs. \$995.00

VIEWPOINT - ADDS

Detachable keyboard, RS232 interface and auxiliary port, 80 x 24 display, tiltable screen
IDADDVWPR Shipping Weight 40 lbs SALE \$599.00



Apr 2-4 Eighty/Apple Computer Show, Statler Exposition Hall, New York, NY, featuring exhibitors selling products and services related to the TRS-80 and Apple systems, including hardware, software, books, supplies and magazines. Also to feature seminars and technical sessions for both systems. Kengore Corp., 3001 Route 27, Franklin Park, NJ 08823, (201) 297-2526.

Apr 4-7 Deltak International Training Conference/Access '82, Hyatt Regency, Chicago, IL, will feature 35 workshop sessions with EDP trainees and professionals. Keynote speaker: Gerald R. Ford. Corporate Communications Assoc., 799 Roosevelt Rd., Building 6, Suite 315, Glen Ellyn, IL 60137, (312) 790-1225.

Apr 5-7 Office Automation Conference, Moscone Center, San Francisco, CA, featuring over 600 booths demonstrating all types of office machine equipment. Seminars in banking, manufacturing, educational institutions, energy-related firms, insurance carriers, independent insurance agents, and defense-related government agencies. OAC '82 Registration, AFIPS, Box 9659, Arlington, VA 22209.

Apr 13-14 Computer Network Performance Symposium, University of Maryland, College Park, MD, focusing on theoretical and practical aspects of measuring and evaluating package-switch networks, computer vendors, network archi-

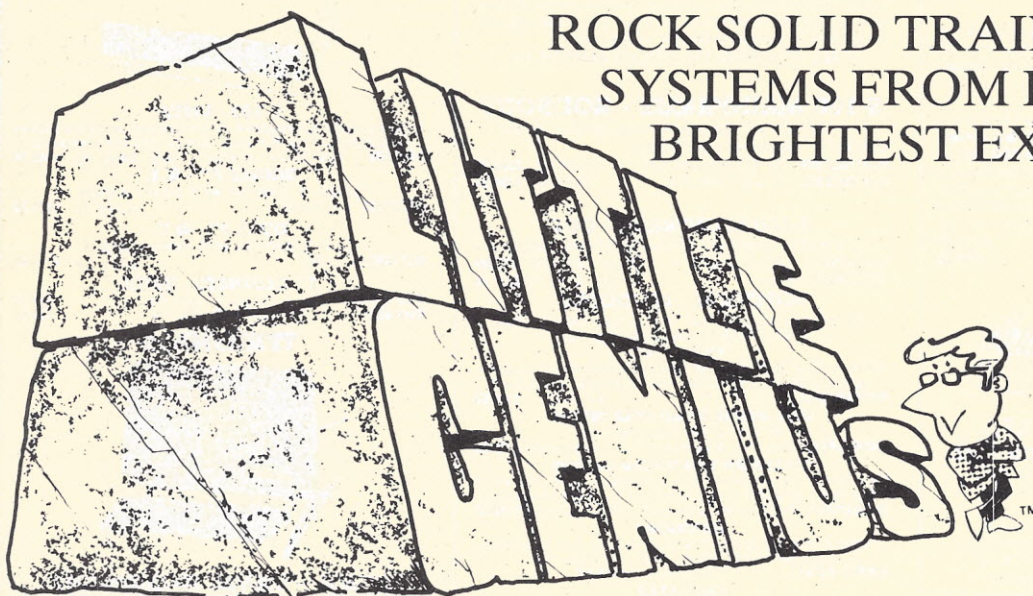
tectures and local area networks. Mitre Corp., W-701, 1820 Dolley Madison Blvd., McLean, VA 22102, (703) 827-6394.

Apr 16-17 Virginia Computer Users Conference, Marriott Inn, Blacksburg, VA, topics will include artificial intelligence, office automation, and data base management. Virginia Polytechnic Institute and State University Student Chapter, 562 McBryde Hall, Blacksburg, VA 24061, (703) 961-6931.

Apr 17-18 Trenton Computer Festival, State College, Trenton, NJ, exhibitions and demonstrations on software and hardware. Dr. Allen Katz, Dept. of Engineering Technology, Trenton Computer Festival, Trenton State College, Hillwood Lakes CN550, Trenton, NJ 08625.

Apr 20-23 Technical Meeting and Equipment Exposition, Marriott Hotel, Atlanta, GA, includes four seminars discussing: engineering methods, environmental stress impact, contamination control, energy, and the environment. Betty L. Peterson, Institute of Environmental Sciences, 940 E. Northwest Highway, Mt. Prospect, IL 60056.

Apr 21-28 Hanover Fair, Hanover Fairgrounds, Hanover, West Germany, showcasing complete business communications systems, telex and facsimile equipment, telecommunications systems for distributed data processing networks, intercommunications systems plus radio and cable communications equipment. Hanover Fairs Information Center, Box 338, Whitehouse, NJ 08888, (201) 534 (800) 526-5978.



ROCK SOLID TRAINING SYSTEMS FROM BRITAIN'S BRIGHTEST EXPERTS

Teach yourself BASIC in 12 hours. Our LITTLE GENIUS self-instruction courses on floppy disk will teach you to master your Micro in 3 easy stages. Each course consists of well-structured fully interactive lessons and is available in 3 separate disk modules.

1. Beginners 2. Advanced 3. Disk operating system at \$39.95 each + Tax
OR take advantage of our SPECIAL OFFER—3-in-one pack price \$99.00 + Tax

BE A LITTLE GENIUS YOURSELF

Courses in BASIC for Apple, ITT 2020, PET and RML 380Z.
Also PASCAL for Apple.

Available from most computer retailers or direct:

In the U.K. write to:
Little Genius, Suite 504, Albany House,
324, Regent Street, London W1R 5AA,
England. Tel: 01-580 6361

In the US write to:
Little Genius, 34-38 83rd Street,
Jackson Heights, New York, U.S.A.

Rush me my order for/send information on:

*BASIC/PASCAL for Machine
Stage Nos. 1, 2, 3 or 3-in-One (Ring as Required)

Name
Address

Cheque enclosed/Purchase Order Enclosed/Send C.O.D.*

*Delete as required

ELECTIC SYSTEMS CORPORATION

Authorized Commodore service center
Repair of the complete line of Commodore products
In a hurry? Check our modular exchange program



HARDWARE:

CBM 8032 Computer, 80 Column	\$1095
CBM 8050 Disk Drive	1340
CBM 4032 Computer, 40 Column	995
CBM 4040 Disk Drive	995
CBM 4022 Printer	649
CBM VIC 20 Computer	263
CBM VS100 Cassette	68
PET to IEEE Cable	33
IEEE to IEEE Cable	39
BASF Diskette, Box of 10	30

SOFTWARE:

OZZ	\$299
Wordcraft 80	299
Tax Preparation System	380
IRMA	380
Dow Jones Portfolio Management System	115
Personal Tax	55
Pascal	229
Assembler Development Package	77
Wordpro 4+	329

Order TOLL FREE 1+800-527-3135

10 AM to 4 PM CDT Monday through Friday

Texas residents call 1+214-661-1370

VISA, MASTER CHARGE, MONEY ORDERS, AND C.O.D. "Certified Check" accepted.

Units in stock shipped within 24 hours, F.O.B. Dallas, Texas.

All equipment shipped with manufacturer's warranty.

Residents of Texas, Louisiana, Oklahoma City and Tulsa, Oklahoma must add applicable taxes.

Eclectic shortly will be announcing products that are designed to work with CBM systems.

1. ROMIO: two RS232 ports — three parallel ports — 26K EPROM memory-managed alternate character set, software controlled — EDOS (extended DOS).
2. Terminal program (options with ROMIO)
3. EPROM programmer
4. Front-end processor
5. Additional firmware to be announced

Be sure to write the address below for more information; dealer inquiries welcome.

P.O. Box 1166 • 16260 Midway Road • Addison, Texas 75001 • (214) 661-1370

Computer Word Processing: Do You Want It?

by R. Dean Boyer

Que Corp., Indianapolis, IN

Reviewed by James C. Graves, Jr.

This book is primarily intended as a guide for those thinking about implementing word processing into their business. However, it will serve as a very good word processing introduction for anyone. The author introduces the subject through a discussion of the word processor and software used to write the book. Then he proceeds to discuss the individual elements of the field.

The beginning chapters provide some background information on basic elements. The first word processors—smart typewriters—are compared and contrasted with current models. For example, the smart typewriters display only a few lines of text, while word processors available today will display from a single paragraph to a full page of text material on a CRT terminal.

A chapter discussing all three types of printer (thermal, dot matrix and letter-quality) includes illustrations of each type.

One chapter discusses software in detail. A thorough examination of editor functions such as wordwrap, cursor movement, search and block moves reiterates the value of good editor software.

Two chapters provide checklists for comparing word processors. A list of features suggests that such things as cursor movement, insertion/deletion, search/replace and block operations be compared. A word processor evaluation scoresheet helps determine whether or not a system is easy to use.

Pictures and illustrations add support to the material. Glossaries of computer and word processing terms define basic jargon.

148 pages \$14.95

The Microchip: Appropriate or Inappropriate Technology?

by Alan Burns

Halstead Press (John Wiley), New York, NY

Reviewed by Dennis Doonan

This book describes the development of microcircuits and their social and economic implications. Microelectronic applications in business, technology and personal use are illustrated to show their impact on the individual and society.

The author evaluates the role of technology in society in the hope of achieving a mutual understanding between the responsible technician and the consumer.

The book offers several views of the future based on the social implications of the microchip. The optimistic view suggests that continued technological growth will result in freely-adapted social changes. The pessimistic view implies that continued technological growth will not result in the corresponding social changes. The author espouses a third view, in which continued technological growth is not inevitable, but will reflect social needs. He pictures technology as an evolutionary—rather than revolutionary—process that must be studied and appreciated for its social benefits. Criteria for the study of the socially useful aspects of microelectronics are presented in the hope of eliminating harmful and inappropriate effects.

The development of the computer and the microprocessor is described in an overview showing the social and economic

142 INTERFACE AGE

implications of the devices. Areas of potential discord caused by these technologies are described in the fields of employment, the individual, education and the media.

While this volume will hold little interest for the home computer or small business user, it will be beneficial to the computer scientist, technologist or the sociologist interested in social ramifications of microcomputers.

180 pages \$39.95

Simple Basic Programs for Business Applications

by J.R.F. Alonso

Prentice-Hall, Englewood Cliffs, NJ

Reviewed by David Marca

This book is probably the most well-documented collection of mathematical calculation procedures to be found. The entire program suite is simple enough to run on any current minicomputer or microcomputer system with Basic. The coverage is extensive: probability, statistics, distributions, regressions, correlations, variance analysis, loans and interest calculations.

A brief mathematical treatment of each calculation is given, together with appropriate references. Graphs, pictures and formulas accompany each description. Sample output is given for most of the programs. Complete program listings are provided for each calculation.

The reader can enter the programs into his computer system by hand, or he can buy them from the publisher. The book claims that only magnetic tapes for minicomputer systems are available, but see if they have the software suite on floppy disks too. The businessman should try to purchase the program suite. This will result in savings in keying in the programs, then debugging after entry. The student of mathematics will find the programs interesting to enter, run and modify. What better way to learn about the principles of numerical calculation?

297 pages \$7.95

Computers and Medicine

by Vernon Sondak, Howard Schwartz, M.D.
and Norman Sondak

Artech House, Dedham, MA

Reviewed by Rocky Smolin

This is a collection of 32 articles by medical professionals drawn from medical journals. As such, one would expect to find generally dry, overly technical and obscure medical dissertations. Instead, the reader is pleasantly surprised, not only by the clarity and comprehensibility of most of the articles, but by the interest they generate and the substantial amount of information they impart.

The first section deals with the interaction of the computer, patient and doctor. The section on computers in medical education covers such topics as computer-assisted surgery, and computer-aided instruction (CAI) for medical students.

Another section explores computer-aided medical decision making in diagnosis, potential suicide identification, and analysis of pre-operative variables for peptic ulcer patients.

The last chapter covers computers in clinical laboratories and how they are assisting in the execution and analysis of laboratory procedures, while reducing errors and costs.

Each chapter is preceded by comments designed to present an overview and orientation for the material in that chapter. Overall, the authors have compiled a fascinating view of how computers are impacting the many areas of medicine.

245 pages \$35

Program for a Puppet
by Roland Perry
Pocket Books, New York, NY
Reviewed by Leigh E. Zeitz

Assassination, computer smuggling, soviet espionage and a computer-designed plan to place a company man from the world's largest multi-national enterprise, Lasercomp, into the office of President of the U.S. are all part of the international intrigue in this novel. The hero, Edwin Graham, is caught in a "David vs. Goliath" battle after he discovers Lasercomp's plans to use its latest product, Cheetah—the ultimate computer, to take control of the world. Graham must expose the scheme without first getting killed.

This book is well-written. Perry has the unique ability to effectively interweave concurrent subplots clearly and logically, so as not to confuse the reader.

Though the book is fiction, it is not all far-fetched. "Every computer function described in the story has either happened or is happening today," explains Perry in his preface. It is the accuracy in his depiction of computer capabilities that sets this novel apart from other science fiction stories. There is no omnipotent computer that runs amok and conquers the world. The computer is used as a tool by a power-hungry old man. The electronic surveillance, the computer-analyzed election campaign, and the dialogues with the Cheetah computer are all believable.

326 pages \$2.95

Explore Computing with the TRS-80
by Richard V. Andree and Josephine P. Andree
Prentice-Hall, Inc., Englewood Cliffs, NJ
Reviewed by David D. Busch

This textbook, prepared by two educators at the University of Oklahoma, presents an interesting introduction to Basic programming with the TRS-80. It was designed to be used for self-instruction—with or without a teacher's assistance.

In classic textbook form, the authors present concepts, self tests, and problems for solution in easy-to-digest morsels. The first four lessons form an introduction to the TRS-80's capabilities in Basic, and may be skimmed or read rapidly by those who already have some familiarity with the computer. The rest of the book deals with 75 micro-research problems, which present interesting challenges to those with any skill level.

The book's scope is ambitious; it tries to be everything to everyone, from grade five through adult business person. Adults and the very young may have some problems with the more difficult assignments. However, the authors have tested every single problem, and found that they can be solved by students with no more than ninth grade mathematical skill.

One chapter is devoted to the special graphics capabilities of the TRS-80. Most of the others contain material that also applies to other computers using a similar form of Microsoft Basic—such as the Apple and Pet.

230 pages \$11.95

Olympic Sales Company

SERVING YOU SINCE 1947
CABLE: "OLYRAV" LSA
Main Showroom & Offices:
216 So. Oxford Ave.
Los Angeles, CA 90004

Telex: 67 34 77
WE HONOR VISA
and MASTERCHARGE



ORDER DESKS
open 6 days a week!

7:00 am to 7:00 pm Mon thru Sat
Order Desks: (213) 739-1130
TOLL-FREE (outside Calif.)
800-421-8045 800-252-2153

Prices shown are for mail or phone orders;
Walk-in slightly higher.

Goods subject to availability;
OSC will meet or beat almost
any advertised price as long as
the competition has the goods
on hand; not responsible for
typographical errors; prices &
specifications subject to change
without notice; this ad supercedes
all previous ads; min ship & hndlg
\$5.95; send \$1.00 for new catalog.

We carry a large inventory of software, & accessories

Texas Instruments

TI-99/4A full typewriter-style keyboard,
Home Computer U/L case & more!
Retail \$950.00

R.F. Modulator (TV Adapter)	38.95	Solid State Printer	298.95
10" Color Monitor	329.00		
Peripheral Expansion Box**	194.00		
RS-232 Card**	136.00		
Disk Controller Card**	194.00	Memory Expansion	288.95
Expansion Box Disk Drive Card**	299.00		
Memory Expansion Card** (RAM)	234.00		
P-Code Card**	194.00		
Solid State Speech™ Synthesizer	114.50		
Telephone Coupler (Modem)	169.50		
RS-232 Accessories Interface	169.50		
Disk Drive Controller* (One Disk Manager module packed with each Disk Controller)	229.50		
P-Code Peripheral	314.00		
Disk Memory Drive	368.50		

PC-100C Print/plotter 149.95

TI-3011 LCD Stu Slide/NEW 18.95

TI-35SP LCD Sci 22.50

TI-40 LCD Sci/NEW 28.95

Bus. Anal. I 19.95

Bus. Anal. II 44.95

Bus. Card 30.95

MBA 54.95

Invest. Analyst 48.95

TI-54 Adv. LCS Sci/NEW 44.95

TI-5511 NEW 44.95

LCD-P. program/NEW 59.95

TI-5100 Display w/mem 39.95

TI-5010 Hand/Print NEW 48.95

TI-5120 Printer/NEW 59.95

TI-5130 Print/Display 79.95

TI-5135 Thrm Print/Dis. 79.95

TI-5142 Print/Display 99.95

TI-57 Prog. scientific 39.95

TI-58C 480 step prog. 89.95

TI-59 960 step prog. 169.95

*also Free \$60 value TI library coupons with purchase thru June 15, 1982

AMDEK (Leedex) Quality Monitors

300-G 12" Green, 18 MHz 249.00 199.95

Color I 13" Color, NTSC comp. input, 449.00 339.95

Color II 13" RGB hi res 1195.00 799.95

PAPER TIGER PRINTERS

460 995.00 895.00

460G graphics 1094.00 969.95

560 1295.00 1099.00

560G graphics 1394.00 1195.00

445 795.00 695.00

445G 894.00 789.00

PAPER TIGER—New Prism Printer for Apple Computers

(prints in 3-4 zone colors, available soon—Retail Your Cost taking orders 132 column 1995.00 1795.00 now 80 column 1196.00 999.00 Prism/Apple software (a must) 59.95

EPSON PRINTERS

MX 70 500.00 369.95

MX 80 w grafrax 700.00 499.95

MX 80FT 745.00 599.95

MX 100 995.00 749.95

Optional grafrax chip 89.00

ATARI Color Video TV Game Programmable! Your Cost: \$146.95 Retail: \$225.00

Intellivision Now in STOCK! Most animated TV game Large selection of cartridges \$234.95 Retail: \$325.00 Y/C: \$234.95

HP-41CV 325.00 256.00

Card Reader for 41CV 215.00 171.00

Printer for 41CV 385.00 294.00

Quad Ram 95.00 84.95

Optical Wand for 41CV 125.00 99.95

HP-41C Calculator 250.00 188.95

Memory mod. for 41C 26.95

Accessories for HP-41CV

HP-82160A HP-IL Interface Module (multiport) 125.00 107.50

HP-82161A Digital Cassette Drive (131K or 18K registers per pass) 550.00 459.95

HP-82162A New printer/plotter, right & left justification, on/off switch & stand by switch; thermal printer. 495.00 409.95

Extended function/memory module (avail. Spring) 75.00 68.95

Extended memory module (avail. Spring) 75.00 68.95

Time module (avail. Spring) 75.00 68.95

HP-IL Accessories

HP-82176A Data mini-cassettes (10 pac) 95.00 89.95

HP-82177A .5 meter HP-IL cable 12.00

HP-82178A 1 meter HP-IL cable 15.00

HP-82179A 5 meter HP-IL cable 20.00

We carry a complete inventory of Libraries, accessories & supplies.



HEWLETT PACKARD

	Retail	Your Cost
HP-125 64K CPU/Terminal/Keyboard	\$2750.00	1999.00
HP-85A Computer	2750.00	1999.00
HP-82903A 16K Memory module	195.00	174.95
HP-7225B GRAPHIC PLOTTER (option 885)	2750.00	1999.00
(opt. 020) Adds USASCII high density print	150.00	139.95
(Option 085) PERSONALITY MOD	750.00	639.95
a MUST for HP-7225B		
Printer, dot mtrix (ask for optns)	3950.00	2995.00
HP-82905A 80 col printer, dot matrix	945.00	755.00
HP-2601A Letter quality prter, daisy wheel	4500.00	3399.00
HP-82901M Dual master (256KB disk drive)	2500.00	1999.00
HP-8885A 2 x 8" disk	5830.00	4499.00
HP-8885A-010 1 x 8" disk	4500.00	3499.00
HP-9134A 4.5 Mb Winchester*	4400.00	3495.00
HP-9135A Winchester + 5 1/4" floppy*	5500.00	4295.00
HP-9138A Winchester + 8" floppy*	8500.00	6599.00
*Hard disks avail. April '82		
Graphics Tablet 9111A	2050.00	1699.00
HP-97 Progrmble printer	750.00	579.95
HP-34C Progrmble scient	150.00	117.95
HP-38C Progrmble bus R/E	150.00	119.95
HP-32E Advanced scient	55.00	48.95
HP-37E Business managemt	75.00	58.95
HP-11C Adv prog scient LCD	130.00	114.95
HP-12C Adv prog finan LCD	150.00	129.95

HP-41CV 325.00 256.00

Card Reader for 41CV 215.00 171.00

Printer for 41CV 385.00 294.00

Quad Ram 95.00 84.95

Optical Wand for 41CV 125.00 99.95

HP-41C Calculator 250.00 188.95

Memory mod. for 41C 26.95

Accessories for HP-41CV

HP-IL Interface Module (multiport) 125.00 107.50

Digital Cassette Drive (131K or 18K registers per pass) 550.00 459.95

New printer/plotter, right & left justification, on/off switch & stand by switch; thermal printer. 495.00 409.95

Extended function/memory module (avail. Spring) 75.00 68.95

Extended memory module (avail. Spring) 75.00 68.95

Time module (avail. Spring) 75.00 68.95

HP-IL Accessories

HP-82176A Data mini-cassettes (10 pac) 95.00 89.95

HP-82177A .5 meter HP-IL cable 12.00

HP-82178A 1 meter HP-IL cable 15.00

HP-82179A 5 meter HP-IL cable 20.00

We carry a complete inventory of Libraries, accessories & supplies.

ATARI Computer

Model 800 16K 1080.00 699.95

800 48K 1280.00 799.95

810 Disk drive 600.00 469.95

Atari VisiCalc 200.00 169.95

825 Impact Ptr 1000.00 779.95

(Centronics 737)

SUPER SPECIAL—ATARI 400 (16K)

Retail: \$595.00 Your Cost: \$339.95

Language Cart. not included—Opt'l at \$54.95

APPLE COMPUTERS

Apple II 48K+ \$1530.00 \$1099.00

Disk w/controller 645.00 539.00

Disk w/o 525.00 459.00

Pascal language system 495.00 389.00

Graphics tablet 795.00 669.00

Silentyne 395.00 339.00

Family System 2495.00 1999.99

Apple III 128K 3495.00 2795.00

Profile 5Mb 3495.00 2795.00

Software & access. at similar discounts

Some Common Basic Programs TRS-80 Level II Edition

by **Lon Poole, Mary Borchers and Karl Koessel**
Osborne/McGraw-Hill, Berkeley, CA

This venerated volume of 76 practical programs is now available for the TRS-80 models I and III. It consists of a collection of plain-vanilla software that can be entered by the user and run on a bare-bones 4K TRS-80.

These are not complex programs. Most are single-function modules designed to perform a given calculation or task. There are no games, data base managers or other lengthy items. The programs break down into three basic types. A few are personal or general purpose programs, which find the day of the week, convert fractional to metric or figure the cost of a recipe.

Some others will be useful for business people who want to figure the value of an investment or annuity, or calculate interest rates. The majority of the programs in this book deal with math and statistical problems. If you are heavily into chi-square distribution or plotting polar equations, this book is a goldmine.

Even if you are interested only in one of the three basic types of software presented, you should find a few that are worth the cost of the book. I'd recommend that you look over the table of contents carefully, and if you find something you like, buy it. These programs have been around for a long time, and should be bug-free.

198 pages \$14.99

—DDB

Introduction to 8080/8085 Assembly Language Programming A Self-Teaching Guide

by **Judi N. Fernandez and Ruth Ashley**
John Wiley, New York, NY

There are those of us who have read several books on assembly language programming, and feel that we understand the concepts fairly well, yet we can't do it. This is the sort of book that just might help break down that last barrier, and turn even the staunchest nonconformist into an accomplished 8080 or 8085 assembly language programmer. In fact, I recommend this guide for those Z-80 users who may have been having trouble comprehending that more advanced chip's huge instruction set. I found that after reading this book, I was better prepared to tackle Z-80 assembly language once again.

The authors seem to explain the basic concepts more clearly, so that the beginner doesn't get lost early in the game. As the going gets tougher, lucid examples and interesting tests ensure that interest and comprehension remain high.

The authors explore input/output, data movement, various types of operations, and register and stack manipulations. Those using 8080 or 8085-based computers will be able to use what they have learned immediately. Fledgling assembly language programmers working with the Z-80 chip will find that this book makes a good primer before taking on the more complex instruction sets of their microprocessor.

304 pages \$8.95

—DDB

Marymae INDUSTRIES, INC.

In Texas, Orders,
Questions & Answers
1-713-392-0747

21969 Katy Freeway
Katy (Houston) Texas 77450

To Order
1-800-231-3680
800-231-3681

SAVE BIG DOLLARS ON ALL TRS-80® HARDWARE & SOFTWARE

TRS-80® by Radio Shack. Brand new in cartons delivered. Save state sales tax. Texas residents, add only 5% sales tax. Open Mon-Sat. 9-6. We pay freight and insurance. Come by and see us. Call us for a reference in or near your city. Ref: Farmers State Bank, Brookshire, Texas.

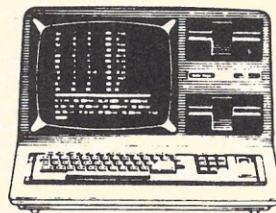
WE OFFER ON REQUEST

Federal Express (overnight delivery) ☒

Houston Intercontinental Airport
Delivery, Same Day Service ☒

U.P.S. BLUE—Every Day ☒

References from people who have
bought computers from us probably
in your city ☒



In stock TRS-80 Model
II and III

☒ No Tax on Out of Texas Shipments!

**Save
10% 15%
OR MORE**

**We Specialize in
Overseas Shipments
TELEX: 77-4132 (FLEXS HOU)**

WE ALWAYS OFFER

☒ NO extra charge for Master Card or Visa

☒ We use Direct Freight lines. No long waits

☒ We always pay the freight and insurance

☒ Toll free order number

☒ Our capability to go to the giant TRS-80®
Computer warehouse 5 hours away, in
Ft. Worth, Texas, to keep you in stock.

® TRS-80 is a Registered Trademark of Tandy Corp.

ED McMANUS



JOE McMANUS



Peachtree Software™

Any good electronic spreadsheet saves time and money. But where the similarities end, MagiCalc™ begins.

Peachtree Software's newest member of its Magic family — MagiCalc — will amaze your customers and delight you with added sales.

Sure, all the "calcs" are data-crunching, time-saving, money-making wonders. But once you get beyond the ways they're similar, MagiCalc stands alone. Because feature by feature, MagiCalc clearly offers users the most advanced capabilities:

- CP/M compatibility with over 25 different microcomputers, including many popular word processing machines.
- Data protection.
- Conditional expressions and logical functions take MagiCalc well beyond "automatic" formula calculation.
- Total user-control by visually diagnosing errors.
- Partial worksheet copy capability allowing users to "cut and paste" on worksheets.
- Capability to display or print all



formulas at once. • Complete format control by block, row or column. • And full line editing.

Show your customers how they can brighten their forecasts. With the help of MagiCalc and other compatible members of the Magic family — Magic Wand™ Word Processor, Magic Spell™, Magic Messenger™, and Magic Address™.

And let us show you how to increase your profits this year. We offer unsurpassed documentation and the largest customer service center in the industry, virtually eliminating the need for dealer support. Compatibility between all software systems, making "one-source" cross-selling easy.

Time-tested, user-refined programs for guaranteed user benefits. All from Peachtree Software. The established business software leader in the microcomputer industry.



For Peachtree Software dealer or product information, call 404/325-8533 or complete this coupon.

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

----- The Very Best "Off-The-Shelf" Software Is "Off-The-Tree." -----

Peachtree Software, 3 Corporate Square, Suite 700, Atlanta, Georgia 30329.

An MSA company.

Peachtree Software, MagiCalc, Magic Wand, Magic Spell, Magic Messenger and Magic Address are Trademarks of Peachtree Software, Incorporated.

New Literature

System reference cards detail information from Basic and Assembler manuals in a compact format. Screen line layout and condition code reference are also included, and graphics symbols are reorganized. Three Radio Shack TRS-80 models are currently available, with cards on other systems soon to be available. Prices: Model I Basic and Assembler for \$4.95, with Basic only for \$2.95; Model III Basic and Assembler card for \$5.95. Nanos Systems Corp., Box 24344, Speedway, IN 46244.

CIRCLE INQUIRY NO. 201

International Software Directory lists thousands of software packages and classifies them by machine, operating system, subject, vendor and price. Review information is also included. It is independent of both machine manufacturers and software houses, and thus allows for comparison and one-stop shopping. It is

backed by an excellent search service and regular updates are available from the publisher. It is available in two volumes: 1) *The International Microcomputer Software Directory* with over 7,000 programs (\$34.95 plus \$2.95 postage and handling); and 2) *The International Minicomputer Software Directory* (\$65). Imprint Editions, 420 South Howes, Fort Collins, CO 80521.

CIRCLE INQUIRY NO. 202

A Rainbow of Applications is a 128-page catalog containing descriptions of approximately 350 products for the Apple computer. Apple computer owners will find this comprehensive catalog an invaluable reference of software, peripherals, manuals and other accessories for the Apple computer. It features products from many manufacturers. Included are programs of all types: business and home applications, education and science, entertainment, languages, personal and utilities. Send \$2 to cover shipping and handling. Rainbow Computing, 19517 Business Center Dr., Northridge, CA 91324.

CIRCLE INQUIRY NO. 203

TM PONY EXPRESS: software for an electronic mail network

Hook up your office and home micro-computers . . . Connect your branch offices . . . Create a micro-computer network with friends, clients or associates . . . All you need is your present telephone and

The Pony ExpressTM



The Pony Express lets two micro-computers exchange any information you choose — letter, a contract, graphics, VisiCalc* models, even other programs — over regular telephone lines. It is custom-fit, fully compatible with your software. With the unique on-line manual and guided walkthru features, a computer novice can master Pony the first time he uses it. Pony's security system, and time and money saving features make it ideal for business applications. Home users will find it equally practical.

The Pony Express is a package that is:

- designed by management consultants, and field-tested in business and professional applications
- easy to use, requiring only plain English. About the most complicated computerese is the term "file."
- easy to learn, displaying WALKTHRU comments and reminders while you run it.
- superbly documented, with a computerized manual that puts you a touch-of-a-button away from all you need to know.

- economical of your time; unattended it handles a diskful of data through its INBASKET and OUT-BASKET features.
- secure and discrete, it lets an operator run the system "blind", never laying eyes on sensitive information.
- reliable, it automatically corrects transmission errors to ensure that what you send is what gets there.
- mindful of your phone bills, the TOLL-SAVER and SUPER TOLL-SAVER features cut transmission time up to 70%.

PONY EXPRESSTM: "thoughtful software"TM from the Philadelphia Consulting Group, Inc.

Available for Radio Shack* 32 K Model III with 2 disks. Most features work with 1 disk. Modem and RS232 communications interface required. INQUIRE ABOUT FUTURE AVAILABILITY FOR OTHER COMPUTERS.

Dealer inquiries invited.

Software for 2-member network: \$140
Each additional member: 40
Manual only (fully credited toward purchase) 15

*Radio Shack and TRSDOS are trademarks of Tandy Corporation. DOSPLUS is a trademark of Micro Systems Software, Inc. VisiCalc is a trademark of Personal Software, Inc.

Visa and Master Card orders:

Call 1-800-227-1617, EXTENSION 203.

In California Call 1-800-772-3545. Specify TRSDOS* or DOSPLUS*. PA residents add 6% sales tax. Inquiries and other orders (payment enclosed): The Philadelphia Consulting Group, Dept. PE-20, P. O. Box 102, Wynnewood, PA 19096.

★ ★ ★ ★ ★ ★
AT LAST! ALL THE POPULAR RADIO SHACK
COMPUTERS CAN TALK WITH EACH OTHER.
BEGINNING APRIL 1st THE PONY EXPRESS ALSO
RUNS WITH MODEL II AND THE NEW MODEL 16.

WE WILL NOT BE UNDERSOLD

CP/M® Software Computer Pathways

Pearl (level 1)	\$ 99/\$25
Pearl (level 2)	\$299/\$40
Pearl (level 3)	\$549/\$50

Digital Research

PL/I-80	\$459/\$35
BT-80	\$179/\$30
Mac	\$ 85/\$15
Sid	\$ 65/\$15
Z-Sid	\$ 90/\$15
Tex	\$ 90/\$15
DeSpool	\$ 50/\$10

Micropro

WordStar	\$319/\$60
Customization Notes	\$ 89/\$na
Mail-Merge	\$109/\$25
WordStar/Mail-Merge	\$419/\$85
DataStar	\$249/\$60
WordMaster	\$119/\$40
SuperSort I	\$199/\$40
Spell Star	\$175/\$40

Microsoft

Basic-80	\$289/\$na
Basic Compiler	\$329/\$na
Fortran-80	\$349/\$na
Cobol-80	\$574/\$na
M-Sort	\$124/\$na
Macro-80	\$144/\$na
Edit-80	\$ 84/\$na
MuSimp/MuMath	\$224/\$na
MuLisp-80	\$174/\$na

Organic Software

Milestone	\$269/\$30
-----------	------------

Supersoft

Diagnostic I	\$ 49/\$20
Diagnostic II	\$ 84/\$20
Disk Doctor	\$ 84/\$20
Forth (8080 or Z80)	\$149/\$30
Fortran	\$219/\$30
Fortran w/Ratfor	\$289/\$35
Other	less 10%

Unicorn

Mince	\$149/\$25
Scribble	\$149/\$25
Both	\$249/\$50

Data Base

FMS-80	\$649/\$45
dbase II	\$595/\$50
Access/80	\$699/\$50

Pascal

Pascal/MT+	\$429/\$30
Pascal/M	\$189/\$20

Miscellaneous

SpellGuard	\$299/\$25
The Last One	\$549/\$na
SuperCalc	\$259/\$50
CBASIC-2	\$ 98/\$20
MicroStat	\$224/\$25
StatPak	\$449/\$40
Micro B+	\$229/\$20

Apple Software (Business)

Micropro

Wordstar	\$239
MailMerge	\$ 89
Wordstar/MailMerge	\$349
SuperSort I	\$159
Spellstar	\$175

Personal Software

Visicalc 3.3	\$229
CCA Data Mgr	\$ 99
Desktop/Plan II	\$229
Visiterm	\$139
Visidex	\$229
Visiplot	\$185



Personal Software (cont.)

Visitrend/Visiplot	\$ 275
Zork	\$ 34
Miscellaneous	
Micro Courier	\$ 219
Super-Text II	\$127
ASCII Express	\$ 59

Apple Software (Entertainment)

Wizard & Princess	\$ 28
Mystery House	\$ 24
Flight Simulator	\$ 29
Raster Blaster	\$ 26
Space Eggs	\$ 18
Sargon II	\$ 29
ABM	\$ 22
Micropainter	\$ 29
Apple Panic	\$ 28
Pool 1.5	\$ 26



Apple Accessories

Z-80 Softcard	\$ 299
Keyboard Enhancer	\$110
Apple Joystick	\$ 49
Sup-r Mod	\$ 25
CPS Multifunction Card	\$199
Videx Board	\$249
16K Card	\$159
Sup-r Fan	\$ 39
ALF9 Voice Board	\$149
CCS Cards	\$ Call
CCS Parallel Model 7720	\$ Call
CCS Serial Model 7710D	\$ Call
CCS Centronics Model 7728	\$ Call

Disk Drives

For TRS-80* Model 1	
CCI-100 5 1/4", 40 Track	\$ 299
Add-ons for Zenith Z-89	
CCI-189 5 1/4", 40 Track	\$ 389
Z-87 Dual 5 1/4" system	\$995
Drives for Z-90	\$ Call
External card edge and power supply included. 90 day warranty/one year on power supply.	

Corvus 5M

Corvus 10M	\$3089
Corvus 20M	\$4489
Corvus Mirror	\$5429
Shugart 8" 801R Raw Drive	\$ 699
TANDON 5 1/4" Raw Drive	\$ 399
Power Supplies	\$ Call

Diskettes—Box of 10

Maxell 5 1/4"	\$ 40
Maxell 8"	\$ 45
BASF/Verbatim 5 1/4"	\$26.95
BASF/Verbatim 8"	\$ 36
Plastic File Box—Holds 50 5 1/4" dskts.	\$ 19
Plastic Library Case 5 1/4"	\$ 3
Plastic Library Case 8"	\$ 4
Head Cleaning Diskette	\$ 25
Floppy Saver	\$10.95
Floppy Saver Rings	\$ 6.95

16K RAM Kits

One Kit	\$13.95
Two Kits	\$25.00
200ns for TRS-80*, Apple II, (specify): Jumpers	\$ 2.50

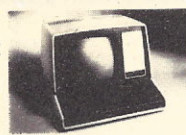
Computer Systems

Altos ACS8000 Series	\$ Call
Atari 400	\$ 359
Atari 800	\$ 789
Call for other Atari products	
Zenith Z89, 48K	\$ Call
Zenith Z90, 64K	\$ Call
Call for other Zenith products	

For fast delivery, send certified checks, money orders or call to arrange direct bank wire transfers. Personal or company checks require one to three weeks to clear. All prices are mail order only and are subject to change without notice. Call for shipping charges.

Terminals

Adds Viewpoint	\$ Call
Zenith Z-19	\$ Call
Televideo 910	\$ 519
Televideo 920C	\$ 729
Televideo 950	\$ 929



S-100 California Computer Systems

Mainframe	\$ 349
Z80 CPU	\$ 239
64K RAM	\$ 569
Floppy Disc Cntrl	\$ 339
Integrated Sys. w/int. cables, tstd.	\$1975
2P + 2S I/O	\$ 269
4 Port Serial I/O	\$ 249
4 Port Parallel I/O	\$ 179

Casio Calculators

Pocket Comp.	FX702	\$185.00
Desk Printr/Calc.	FR100	\$ 79.95
Scientific Calc.	FX8100	\$ 49.95
Game Watch	CA90 Plastic	\$ 49.95
Game Watch	CA901 Steel	\$ 69.95
Calendar Watch	AX210	\$ 59.95

Printers

NEC Spinwriter	
7710 R.O. Ser	\$2395
7710 Ser w/tr.	\$2595
7720 KSR w/tr.	\$2795
7730 R.O. Par	\$2395
7730 R.O. Par w/tr.	\$2595
NEW 3500 Series	\$ Call

Epson MX-70

Epson MX-80	\$ Call
Epson MX-80FT	\$ Call
Epson MX-100	\$ Call

PaperTiger 445 Gr. & 2K

PaperTiger 460 Gr. & 2K	\$ Call
-------------------------	---------

PaperTiger 560 Gr.

IDS Prism 80	\$ Call
--------------	---------

IDS Prism 132

PaperTiger Access.	\$ Call
--------------------	---------

Anadex DP-8000

Anadex DP-9500/01	\$1389
-------------------	--------

Okidata Microline 80 Fric. & pin feed

Okidata Microline 82A Fric. & pin feed	\$ Call
--	---------

Okidata Microline 83A 120 cps

Okidata 84 200 cps	\$ Call
--------------------	---------

Centronics 739

C.ltoh Starwriter I 25 cps, par.	\$1525
----------------------------------	--------

C.ltoh Starwriter I 25 cps, ser.

C.ltoh Starwriter II 45 cps, par.	\$1620
-----------------------------------	--------

C.ltoh Starwriter II 45 cps, ser.

Axiom GP-80M	\$1950
--------------	--------

Data South 180 cps

Olivetti DY 211 Daisy Wheel	\$ 319
-----------------------------	--------

Monitors

Leedex 12" B & W	\$ 129
Leedex 12" Green Screen	\$ 139
Leedex 13" Color	\$ 329
Sanyo 9" B & W	\$ 149
Sanyo 9" Green Screen	\$ 189
Sanyo 12" Green Screen	\$ 249
Sanyo 12" B & W	\$ 239
Sanyo 13" Color	\$ 449
Zenith 13" Color	\$ 349
Zenith 12" Green Screen	\$ 129

Telecommunications

Prentice Star Modem 1-yr. guar.	\$ 125
Univ. Data System UDS103LP	\$ 135
Univ. Data System UDS103JP	\$ 175
Novation Cat	\$ 139
Novation D-Cat	\$ 149
Novation Auto-Cat	\$ 199
Novation Apple Cat II	\$ 299
D.C. Hayes Smart. Modem	\$ 249
D.C. Hayes Micro-Modem II	\$ 295
CCI Telnet Com. Package	\$ 135

DEALER (NATIONAL/INTERNATIONAL) INQUIRIES INVITED

Send for FREE Catalogue

The CPU SHOP

TO ORDER CALL TOLL FREE 1-800-343-6522

TWX: 710-348-1796

Massachusetts Residents call 617/242-3361

420-423 Rutherford Ave., Dept. 1A04M
Charlestown, Massachusetts 02129
Hours 9 AM-8 PM (EST) Mon.-Fri. (Sat. till 5)

Technical Information call 617/242-3361
Massachusetts Residents add 5% Sales Tax
Tandy Corporation Trademark® Digital Research



Game Corner
Continued from page 22



Listing 1

```

10 REM FOG INDEX (1) NOV '81
100 FOR RAM=.....TO....
110 : LE$=CHR$(PEEK(RAM))
120 : PRINT LE$;
130 : IF LE$<>" " THEN 170
140 : IF WL>8 THEN CC=CC+1
150 : IF WL>0 THEN WC=WC+1
160 : WL=0:GOTO 200
170 : IF ASC(LE$)<>46 THEN 190
180 : SE=SE+1:GOTO 140
190 : WL=WL+1
200 NEXT RAM
210 :
220 :
230 :
650 RL=.4*(WC/SE+CC*100/WC)
660 :
700 FOR B=1TO5:PRINT:NEXT
710 PRINT " ;WC;" Words.":PRINT
720 PRINT " SE;" Sentences.":PRINT
730 PRINT " CC;" Words with 3":PRINT
740 PRINT " or more syllables."
750 PRINT:PRINT:RL=INT(RL*10+.5)/10
760 PRINT " Reading level is about"
770 PRINT:PRINT " Grade ";RL
997 :
998 PRINTCHR$(7)
999 END

```

Listing 2

```

1 REM FOG INDEX NOV '81
5 CLEAR

```

```

10 W3=0:WC=0:SE=0:WL=0:SY=0:RL=0
20 LE$="":PLE$="":VW$=""
40 V$="aeiouAEIOUyy"
50 :
100 FOR RAM=.....TO....
120 : LE$=CHR$(PEEK(RAM))
140 : PRINT LE$;
150 : GOSUB 500
160 : IF LE$<>" " THEN 240
220 : GOTO 260
240 : IF ASC(LE$)<>46 THEN 280
245 : IF WL>0 THEN SE=SE+1
246 : PLE$="NOT VOWEL"
260 : IF WL>0 THEN WC=WC+1
264 : SY=0:WL=0:GOTO 300
280 : WL=WL+1
300 NEXT RAM
301 :
305 GOTO 650
310 :
320 :
500 IF SY>2 THEN 600
510 FOR CT=1 TO 12
520 : VW$=MID$(V$,CT,1)
525 : IF LE$=VW$ THEN 570
530 NEXT CT
560 PLE$="NOT VOWEL":GOTO 600
570 IF PLE$="VOWEL" THEN 600
580 PLE$="VOWEL"
590 SY=SY+1:IF SY=3 THEN W3=W3+1
600 RETURN
640 :
650 RL=.4*(WC/SE+W3*100/WC)
660 :
700 FOR B=1TO32:PRINT:NEXT
710 PRINT " ;WC;" Words.":PRINT
720 PRINT " SE;" Sentences.":PRINT
730 PRINT " W3;" Words with 3":PRINT
740 PRINT " or more syllables."
750 PRINT:PRINT:RL=INT(RL*10+.5)/10
760 PRINT " Reading level is about"
770 PRINT:PRINT " Grade ";RL
997 :
998 PRINTCHR$(7)
999 END

```

Listing 3

```

1 REM LISTING (3) NOV'81
5 CLEAR
10 W3=0:WC=0:SE=0:WL=0:SY=0:RL=0
20 LE$="":PLE$="":VW$=""
30 FL$="TRUE"
40 V$="aeiouAEIOUyy"

```



```

50 :
100 FOR RAM=...TO...
120 : LE$=CHR$(PEEK(RAM))
140 : PRINT LE$:
150 : GOSUB 500
160 : IF LE$<>" " THEN 240
200 FL$="TRUE"
220 : GOTO 260
240 : IF ASC(LE$)<46 THEN 280
245 : IF WL>0 THEN SE=SE+1
246 : PLE$="NOT VOWEL"
260 : IF WL>0 THEN WC=WC+1
264 : SY=0:WL=0:GOTO 300
280 : WL=WL+1
300 NEXT RAM
301 :
305 GOTO 650
310 :
320 :
500 IF SY>2 THEN 610
510 FOR CT=1 TO 12
520 : VW$=MID$(V$,CT,1)
525 : IF LE$=VW$ THEN PLE$="VOWEL":GOTO 600
530 NEXT CT
570 IF PLE$="NOT VOWEL" THEN 610
580 PLE$="NOT VOWEL"
590 SY=SY+1:IF SY=3 THEN W3=W3+1
600 IF FL$="TRUE" THEN SY=1:PLE$="NOT VOWEL"
610 FL$="FALSE":RETURN
640 :
650 RL=.4*(WC/SE+W3*100/WC)
660 :
700 FOR B=1TO 32:PRINT:NEXT
710 PRINT " ";WC;" Words.":PRINT
720 PRINT " ";SE;" Sentences.":PRINT
730 PRINT " ";W3;" Words with 3":PRINT
740 PRINT "      or more syllables."
750 PRINT:PRINT:RL=INT(RL*10+.5)/10
760 PRINT "Reading level is about"
770 PRINT:PRINT "Grade ";RL
997 :
998 PRINTCHR$(7)
999 END

```

Listing 4

```

10 "      FOG INDEX FOR TRS-80 DISK FILES
20 CLS: PRINT "THIS PROGRAM WILL COMPUTE THE"
30 PRINT "FOG INDEX OF ANY ASCII DISK FILE."
40 CLEAR 1000
50 DIMW$(256): N=0: LTR=0: WRD=0: BIG=0: SEN=0
60 INPUT "FILENAME ";F$: OPEN "I", 1, F$
70 IF EOF(1) THEN CLOSE: GOTO 280
80 LINE INPUT#1,A$:N=LEN(A$): IF N=0 GOTO 70
90 FOR I=1 TO N: W$(I-1)=MID$(A$,I,1): NEXT: N=N-1
100 "      W$ ARRAY STORES EACH LETTER OF THE LINE
110 CLS: FOR J=0 TO N: PRINT W$(J): NEXT
120 FOR J=0 TO N: PRINT @J, CHR$(191):
130 IF W$(J)>="A" THEN LTR=LTR+1: GOTO 250
140 IF W$(J)<>" " THEN GOTO 210
150 IF W$(J+1)=" " THEN GOTO 210

```

```

160 " COUNT NEW WORD FOR SINGLE SPACE OR
170 " LAST SPACE OF MULTIPLE SPACES
180 WRD=WRD+1
190 IF LTR>8 BIG=BIG+1
200 LTR=0
210 IF W$(J)=". " THEN SEN=SEN+1
220 IF W$(J)="!" THEN SEN=SEN+1
230 IF W$(J)="? " THEN SEN=SEN+1
240 IF W$(J)=":" THEN SEN=SEN+1
250 PRINT@J, W$(J):NEXT J
260 IF W$(N)<>" " THEN WRD=WRD+1
270 GOTO 70
280 FOG=.4*((WRD/SEN)+(BIG/WRD)*100):PRINT
290 PRINT SEN;" SENTENCES "
300 PRINT WRD;" WORDS "
310 PRINT WRD/SEN;" WORDS PER SENTENCE "
320 PRINT BIG;" WORDS OVER 8 LETTERS LONG"
330 PRINT BIG/WRD*100;" % WORDS OVER 8 LETTERS LONG"
340 PRINT "FOG INDEX=";FOG
350 END

```

Sample run

```

47 SENTENCES
933 WORDS
19.8511 WORDS PER SENTENCE
44 WORDS OVER 8 LETTERS LONG
4.71597 % WORDS OVER 8 LETTERS LONG
FOG INDEX= 9.82682
READY
>
>PROGRAM OUTPUT FOR TEXT OF THIS MONTH'S ARTICLE.

```

Listing 5

```

5 'BRLAKOUT
10 A=0: 'BALLS USED
15 S=0: 'SCORE
20 CLS0
30 FOR X=0 TO 63
40 FOR Y=4 TO 12 STILL 2
50 SLT(X,Y,RND(6)+2)
60 NLXTY,X: '20-60 DRAWS WALL
70 X=30: Y=13: 'INITIAL BALL POSITION
80 Q=RND(2)-1: 'IF Q=0 BALL MOVES RIGHT
90 W=0: 'IF W=0 BALL MOVES DOWN
100 IF A=4 THEN END '4 BALL MAXIMUM
110 D=JOYSTK(0): 'READ JOY STICK
120 IF D<2 THEN D=2
130 IF D>61 THEN D=61: 'KEEP PADDLE ON SCREEN
140 FOR F=D-2 TO D+2
150 SLT(F,31,1)
160 NLXT F: '140-160 DRAW PADDLE
170 IF X>61 THEN Q=1: 'START BALL MOVING RIGHT
180 IF X<2 THEN Q=0: 'START BALL MOVING LEFT
190 IF Y>28 THEN W=1: 'START BALL MOVING UP
200 IF Y<4 THEN W=0: 'START BALL MOVING DOWN
210 RESET(X,Y): 'ERASE BALL
220 IF Q=1 THEN X=X-(RND(2))
230 IF Q=0 THEN X=X+(RND(2))
240 IF W=1 THEN Y=Y-2
250 IF W=0 THEN Y=Y+2
260 IF Y>28 THEN Y=30
270 ' 220-260 NLW BALL LOCATION
280 PRINT @1,"SCORE=";S "SHOTS LEFT="3-A
290 IF POINT(X,Y+1)=1 THEN 100: 'BALL HIT PADDLE
300 FOR F=D-2 TO D+2
310 RESET(F,31)
320 NLXT F: '300-320 ERASE PADDLE
330 IF POINT(X,Y)>2 THEN 500: 'BALL HIT WALL
340 IF Y<30 THEN 400
350 'FALLS THROUGH IF BALL MISSES PADDLE
360 A=A+1: 'NLXT BALL
370 FOR X=1 TO 10
380 SOUND 1,1: NLXT X: 'MISSES BALL SOUND
390 GOTO 70
400 SLT(X,Y,2): GOTO 100
500 'HIT WALL
510 W=-W+1: 'CHANGE 0 TO 1 AND VISA VERSA
520 S=S+13-Y: 'INCREASEL SCORE
530 RESET(X,Y): 'ERASE BRICK
540 SOUND 200-(10*Y),1
550 GOTO 100

```


Commodore Logbook*Continued from page 51***Sample worksheet**

CONSOLIDATED REPORT

	Jan.	Feb.	March	April	May	June	YTD.

Gross Bilng's							
Client 1	240000.00	240000.00	240000.00	240000.00	240000.00	240000.00	1440000.00
Client 2	102575.00	107703.75	113088.94	118743.38	124680.55	130914.58	697706.21
Client 3	837000.00	837000.00	837000.00	837000.00	837000.00	837000.00	5022000.00
Client 4	625037.00	625037.00	625037.00	625037.00	625037.00	625037.00	3750222.00
Client 5	497375.00	497375.00	497375.00	497375.00	497375.00	497375.00	2984250.00
Client 6	257000.00	282700.00	310970.00	342067.00	376273.70	413901.07	1982911.77
Client 7	985000.00	985000.00	985000.00	985000.00	985000.00	985000.00	5910000.00
Client 8	253000.00	258060.00	263221.20	268485.62	273855.34	279332.44	1595954.60
Client 9	829000.00	829000.00	829000.00	829000.00	829000.00	829000.00	4974000.00
Client 10	957000.00	957000.00	957000.00	957000.00	957000.00	957000.00	5742000.00
Tot. Billings	5582987.00	5618875.75	5657692.14	5699708.01	5745221.59	5794560.09	34099044.58

Client	Commission
Client 1	0.15
Client 2	0.15
Client 3	0.10
Client 4	0.15
Client 5	0.15
Client 6	0.15
Client 7	0.15
Client 8	0.20
Client 9	0.15
Client 10	0.15

Revenue

Client 1	36000.00	36000.00	36000.00	36000.00	36000.00	36000.00	216000.00
Client 2	15386.25	16155.56	16963.34	17811.51	18702.08	19637.19	104655.93
Client 3	83700.00	83700.00	83700.00	83700.00	83700.00	83700.00	502200.00
Client 4	93755.55	93755.55	93755.55	93755.55	93755.55	93755.55	562533.30
Client 5	74606.25	74606.25	74606.25	74606.25	74606.25	74606.25	447637.50
Client 6	38550.00	42405.00	46645.50	51310.05	56441.06	62085.16	297436.77
Client 7	147750.00	147750.00	147750.00	147750.00	147750.00	147750.00	886500.00
Client 8	50600.00	51612.00	52644.24	53697.12	54771.07	55866.49	319190.92
Client 9	124350.00	124350.00	124350.00	124350.00	124350.00	124350.00	746100.00
Client 10	143550.00	143550.00	143550.00	143550.00	143550.00	143550.00	861300.00
Tot. Revenue	808248.05	813884.36	819964.88	826530.48	833626.01	841300.64	4943554.42

Salaries

Officers	95000.00	95000.00	95000.00	95000.00	95000.00	95000.00	570000.00
Creative	62000.00	62000.00	62000.00	65000.00	65000.00	65000.00	381000.00
Act. Svcs	15000.00	15000.00	15000.00	15000.00	15000.00	15000.00	90000.00
Adminst.	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	72000.00
Media	11000.00	11000.00	11000.00	11000.00	11000.00	11000.00	66000.00
R/TV Prod.	8700.00	8700.00	9500.00	9500.00	9500.00	9500.00	55400.00
Research	7000.00	7000.00	7000.00	7000.00	7000.00	7000.00	42000.00
R/TV Business	8300.00	8300.00	8300.00	8300.00	8300.00	8300.00	49800.00
Traffic	7200.00	7200.00	7200.00	7200.00	7200.00	7200.00	43200.00
Technical	9600.00	9600.00	9600.00	9600.00	9600.00	9600.00	57600.00
							0.00
Tot. Salaries	235800.00	235800.00	236600.00	239600.00	239600.00	239600.00	1427000.00

Worksheet continues on page 152



COMPUTER TUTOR CORPORATION™

DISCOUNT

- HARDWARE
- SOFTWARE
- FURNITURE SALES

NO OUT OF STATE SALES TAX

90 DAY WARRANTY

WE'LL BEAT ANY PRICE!!!

Save on These Products and More

— *Certified Teachers* —

For Computer Educational

Tutoring Courses

Pre-School • Adults

- APF's Imagination Machine
- Apple
- Atari
- Cromenco
- Centronics
- Corvus
- Digital
- Diablo
- Exidy
- Epson
- IBM
- Leedey
- Lear Siegler
- Lexicon

- Mountain Hardware
- Micro Term
- NEC
- Novation
- North Star
- Osburn I
- RCA
- Shugart
- Texas Instruments
- Teletype
- Televideo
- U.S. Robotics
- Xerox
- Vector Graphic

COD or Credit Card

PHONE

In State (504) 362-1587

Out of Town 1-800-535-4183

3221 Behrman Place • Suite 203 • New Orleans 70114



Sample worksheet (continued)

Persnl. Costs

Freelance	3000.00	3200.00	2750.00	3150.00	3700.00	3400.00	19200.00
Freelance Art	7200.00	7300.00	7500.00	7200.00	7500.00	6700.00	43400.00
Freelance Cpy	10000.00	9700.00	11000.00	9800.00	12000.00	8500.00	61000.00
Temp. Help	2000.00	1500.00	1700.00	1900.00	2100.00	2150.00	11350.00
Media Svcs.	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	6000.00
Ofc. Life Ins	2500.00	2500.00	2500.00	2500.00	2500.00	2500.00	15000.00
Payroll Tax	3600.00	3600.00	3600.00	3600.00	3600.00	3600.00	21600.00
Group Ins.	5000.00	5000.00	5000.00	5000.00	5000.00	5000.00	30000.00
Emp Agcy Fee	750.00	750.00	750.00	750.00	750.00	750.00	4500.00
Tot. Persnl.	35050.00	34550.00	35800.00	34900.00	38150.00	33600.00	212050.00

Occupance

Rent	3000.00	3000.00	3000.00	3000.00	3000.00	3000.00	18000.00
Tax	600.00	600.00	600.00	600.00	600.00	600.00	3600.00
Utilities	450.00	450.00	450.00	450.00	450.00	450.00	2700.00
Amotrization	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	7200.00
Tot Occupance	5250.00	5250.00	5250.00	5250.00	5250.00	5250.00	31500.00

Trvl. & Prmtn

Travel	3000.00	3000.00	3200.00	3300.00	3200.00	3500.00	19200.00
Entertainment	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	6000.00
Local Fares	250.00	250.00	250.00	250.00	250.00	250.00	1500.00
PR	2000.00	2200.00	2500.00	1800.00	2100.00	2300.00	12900.00
Tot. Tvl/Pmt	6250.00	6450.00	6950.00	6350.00	6550.00	7050.00	39600.00

Research

Research	2500.00	2500.00	2500.00	2500.00	2500.00	2500.00	15000.00
Client c/o	5000.00	4500.00	5700.00	5500.00	5800.00	4300.00	30800.00
New Business	2750.00	2750.00	2750.00	2750.00	2750.00	2750.00	16500.00
R/TV Expenses	7500.00	7500.00	7500.00	7500.00	7500.00	7500.00	45000.00
Tot. Research	17750.00	17250.00	18450.00	18250.00	18550.00	17050.00	107300.00

[illegible]

A-VIDD
electronics co.

A-VIDD
March
Specials
Apple®

Apple Add-on Hardware

	Reg.	Sale
TKC Keypad	150.00	130.00
TKC Joystick	49.95	45.00
TKC Game Paddles	29.95	25.00
Zenith 12" Green Phosphor Monitor	159.95	129.00
NEC 12" Color Monitor	495.00	399.00
Sanyo 13" Color Monitor	550.00	450.00
Super Fan II	69.95	65.00
Hayes Smartmodem	279.00	249.00
Hayes Micromodem II	379.00	299.00
Microsoft 2-80 Card	395.00	285.00
Microsoft 16K Ram Card	199.00	145.00
3M 744-0 Diskettes (10)	50.00	28.00

Apple Software

Apple Software	Reg.	Sale
Visicalc 3.3	200.00	165.00
Visifile	250.00	205.00
Visiplot	179.00	145.00
Visitrend/Visiplot	260.00	215.00
Visidex	200.00	165.00
Visiterm	150.00	125.00
Desktop Plan II	200.00	165.00
DB Master	229.00	175.00
DB Master Utility	99.00	75.00

For a limited time, we will have available one of the best word processing packages for the Apple II Computer System.

Programma Apple Pie	150.00	99.95
---------------------	--------	-------

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

New Systems Now In Stock:

NEC PC8001A 32K System	995.00
NEC PC8012A I/O Unit	649.00
NEC PC8031A Dual 5 $\frac{1}{4}$ " Disk	995.00
Xerox 820-1 Dual 5 $\frac{1}{4}$ " Drives	2695.00
Xerox 820-1 Dual 8" Drives	3375.00

Immediate delivery. Call for shipping rates. Prices subject to change without notice. All software sales final.

A-VIDD
electronics co.

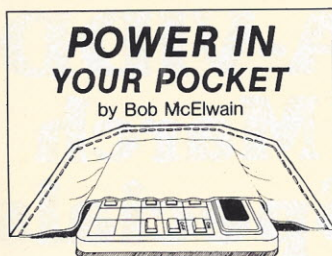
800 / 421-7542

Source I.D. #TCW547

**2210 Bellflower Blvd.,
Long Beach, CA 90815
(213) 598-0444**
MON.-THURS., 8:30-5:30
FRI. TIL 9; SAT., 10:00-5:30

**4930 Campus Drive,
Newport Beach, CA 92660
(714) 851-1295**
MON.-FRI., 8:30-5:30





Program listing

5: PRINT "MOVING AVERAGE"

- A is the maximum number of elements that memory can hold. Set A to the number of memories available with the program loaded, plus 14. (12 program variables are used).
- B is the offset for indexing A. On Casio delete all reference to B or set B to zero.

10: A=54: B=12

15: PAUSE "OPTIONS FOLLOW. ENTER"

20: PAUSE "ANY CHAR TO SELECT"

25: INPUT "ADD DATA? ";I\$: GO TO 100

30: INPUT "RUN AVES? ";I\$: GO TO 300

35: INPUT "EDIT DATA? ";I\$: GO TO 400

40: GO TO 15

@@@ ADD DATA @@@

100: PRINT "ADD DATA"

105: PAUSE "EXIT ON ZERO"

- If array is full, go to use the last position.

110: IF C=A THEN 145

- Add a data item to the next available position.

115: E=B+C+1: INPUT "NEW? ";A(E)

- Exit if zero.

120: IF A(E)=0 THEN 15

- Display for approval.

125: PRINT "NEW IS ";A(E)

- Return for re-entry on any character.

130: INPUT "OK? ";I\$: GO TO 115

- Increase count of elements in use.

135: C=C+1

- Go to compute latest average.

140: GO TO 190

- Here if will use last data position. Begin by rolling data back. The first element is discarded.

145: PRINT "DO NOT BREAK"

150: FOR E=B+2 TO B+C

155: A(E-1)=A(E)

160: NEXT E

165: PRINT "BREAK OK"

- Get new data item.

170: E=B+C: INPUT "NEW? ";A(E)

- Exit on zero. Set counter back one.

175: IF A(E)=0 LET C=C-1: GO TO 15

- Display for approval.

180: PRINT "NEW IS ";A(E)

- Return for re-entry on any character.

185: INPUT "OK? ";I\$: GO TO 170

- Find number of periods to average. If zero (a start), set to one. Actual number to be used must be set in edit routine.

190: F=D: IF F=0 LET F=1

- If the number of data items loaded is less than the requested number to be averaged, use the present number of data items.

195: IF F>C LET F=C

- Accumulate for average.

200: G=0

205: FOR E=B+C-F+1 TO B+C

210: G=G+A(E)

215: NEXT E

- Compute and round average to hundredths.

220: G=INT(G/F*100+.5)/100

225: PRINT F;"DAY AVE IS ";G

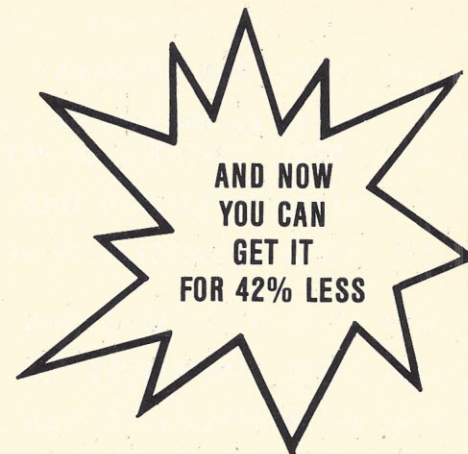
- ENTER only for another entry. Exit on any character.

230: INPUT "ANOTHER? ";I\$: GO TO 15

THE VIDEO-COMPUTER INTERFACE

Get it in
VIDEOPLAY MAGAZINE

The How-To Magazine of Home Video



Get plans and directions for building a \$20 video controller that routes your VCR, personal computer, videodisc player, video game, antenna or cable TV signal to your television set.



- ... and a home satellite dish for under \$800.
- ... and the lowdown on what's new in programmable video games ...
- ... and How-To tips on VCR repair, boosting your antenna signal, etc.
- ... and 25 ways to save money in video.
- ... and Test Reports with more coming on Zenith, Sony, JVC, RCA, etc.
- ... and Exclusive Videoplay Lists of movies available on videocassette.

CIRCLE INQUIRY NO. 89

**SIGN UP
NOW—
RATES ARE
GOING
UP!**

VIDEOPLAY MAGAZINE SUBSCRIPTION ORDER FORM

51 Sugar Hollow Road Danbury, Conn., 06810

Yes! ... Sign me on as a subscriber to the bi-monthly **VIDEOPLAY** MAGAZINE at the rate of ☐ \$6 for 6 issues, ☐ \$12 for 12 issues, or ☐ \$18 for 18 issues. (Outside the U.S. add \$1 in U.S. funds per issue.)

IA-1

☐ Payment is enclosed ☐ Bill me ☐ Order being processed
Charge my ☐ Master Charge ☐ Visa
Card No. _____ Expiration Date _____

Name: _____

Mailing address: _____

City: _____

State: _____ Zip: _____

OFFER EXPIRES MAY 31, 1982

235: GO TO 105

@@@ RUN AVERAGES @@@

300: PRINT "RUN AVERAGES"

- Get parameters of run.

305: INPUT "LOWEST # OF PERS? ";J

310: IF (J<1)+(J>C)>0 THEN 305

315: INPUT "HIGHEST # OF PERS? ";L

320: IF (L<J)+(L>C)>0 THEN 315

325: INPUT "INCREMENT? ";H

330: IF (H<1)+(H>L)>0 THEN 320

- Loop per parameters entered above.

335: FOR F=J TO L STEP H

- Loop through the data for averages of F periods.

340: FOR K=B+1 TO B+C-F+1

- Accumulate F periods for average, beginning with item K.

345: G=0

350: FOR E=K TO K+F-1

355: G=G+A(E)

360: NEXT E

- Compute average and round to hundredths.

365: G=INT(G/F*100+.5)/100

- Change to PAUSE for continuous display.

370: PRINT K-B;" ";F;"DAY AVE IS ";G

375: NEXT K

380: NEXT F

385: GO TO 15

@@@ EDIT DATA @@@

400: PRINT "EDIT DATA"

- Display number of periods to be averaged for possible change.

405: PRINT "# OF PERS IS ";D

- ENTER only if no change required.

410: INPUT "OK? ";I\$: GO TO 420

415: GO TO 430

- Change number of periods.

420: INPUT "NEW # OF PERS? ";D

425: GO TO 405

430: PAUSE "EXIT ON ZERO"

- Loop through data set. J is count of data items in use.

440: J=0

445: J=J+1

- Display present data.

450: E=B+J:PRINT"PER ";J;" DATA=";A(E)

- Leave unchanged if ENTER only.

455: INPUT "NEW? ";A(E)

- Exit on zero.

460: IF A(E)=0 LET J=J-1: GO TO 475

- Continue if maximum not reached.

465: IF J<A THEN 445

470: PRINT "ARRAY IS FULL"

- If count greater than original count, save the new count.

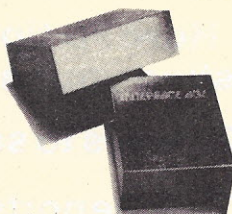
475: IF J>C LET C=J

480: GO TO 15

999: END

LET US SLIP ONE OVER ON YOU . . .

INTERFACE AGE Binders and Slip Cases protect a full year—12 issues—from dust, damage; and keep your magazines in one place, at your fingertips, whenever you need them. Each Binder and Slip Case is constructed of a handsome brown vinyl with INTERFACE AGE stamped in gold foil on the front cover and spine.



DATA DYNAMICS TECHNOLOGY
P.O. Box 1217, Cerritos, CA 90701

NAME (Print) _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Please send me:

_____ Binders @ \$7.50 each

TOTAL ORDER \$ _____

_____ Slip Cases @ \$7.25 each

***TAX \$** _____

Shipping and Handling Charges
\$2.50 ea. U.S.; \$5.00 ea. Foreign

SHIPPING & HANDLING \$ _____

TOTAL ENCLOSED \$ _____

☐ Check or Money Order (U.S. Funds drawn on U.S. bank) Enclosed

☐ Visa # _____ ☐ M/C # _____ ☐ Am/Ex # _____

Exp. Date _____ Signature _____

*California residents add 6% sales tax. Availability and prices quoted subject to change without notice. Please allow 6 weeks for delivery. You may photocopy this page to keep your INTERFACE AGE intact. Orders cannot be shipped unless accompanied by payment, including shipping & handling and tax where applicable.

DATA DYNAMICS TECHNOLOGY, A Division of INTERFACE AGE Magazine
(213) 926-9548

Poor Documentation Bugging You?

Too many choices in new systems?
Can't sort out your application needs?
Need the latest information on mass digital communications?

SUBSCRIBE NOW to
DataCastTM
(the hardcopy version)

DataCast is a user's reference publication for major microcomputer software systems and mass digital communications.

DataCast provides application oriented tutorials, software documentation and user's reference guides, and progress reports on new computerized information services. The content is up-to-date and complete, the writing style is consistent, and the documentation is designed for long-term use.



SUBSCRIBE.

CLIP THE FORM BELOW AND SEND IT TO: *DATACAST*, 345 SWETT ROAD WOODSIDE CA 94062

YES! Please enter my subscription to *DataCast*TM (the hardcopy version), Jim Warren's new user's reference periodical.

☐ Start my subscription with the first issue ☐ Start my subscription with the second issue (I have the first issue)

☐ I enclose \$18 (U.S.) for one year's subscription (bimonthly).

☐ Please bill me. I will promptly pay, so my subscription can promptly begin.

☐ Please send me foreign rates.

☐ Please bill to my charge card: ☐ Master Charge, ☐ VISA

No..... expires..... M/C bank code.....

(please type or print)

name.....

mailing.....

address.....

city.....

state..... ZIP code.....

Do you use a computer system? If so, what operating system?

What software packages do you use?

What applications do you use a computer for?

What devices do you use with your computer system?

Do you use any information services or computer networks?

What services do you recommend?

What information do you regularly receive?

IA81

CIRCLE INQUIRY NO. 29

MICRODEX

MICRO INDEX CLASSIFIED

COMPUTER CALLIGRAPHY. Add humor to your workstation with hand-written motto: "Old computers never die, they just lose their Byte." 5x7 matted for framing. \$6.95. Neal Powell 142, 510 West End Blvd., Winston Salem, N.C. 27101.

BUILD IT. Give your home computer the workstation it deserves. Use our easy plans to build a professionally finished product. \$3.95. Neal Powell 141, 510 West End Blvd., Winston Salem, N.C. 27101.

Memory Typewriter Software. Use your Apple II and printer as a memory typewriter and save the text on disk—\$20 check or M.O. Executive Computer Services, 330 Selma Ave., St. Louis, MO 63119.

WANTED: DAISY WHEELS. All Non-English Printwheels, specials etc. Coloured Ribbons, for use on: Olivetti, Olympia, IBM, Diablo etc. Please send details to: Glengyle Pty. Ltd., P.O. Box 7, Budgewoi 2263, N.S.W. Australia.

MESSAGE-MAKING SOFTWARE for APPLE. Place your disk in the drive, enter text at the keyboard, and watch your colorful, dynamic, large-letter message appear on the screen. Great for store-windows, counter-tops, trade-show exhibits, classrooms, etc. CONNECTICUT INFOSYSTEMS, 218 Huntington Road, Bridgeport, CT 06608, (203) 579-0472.

CP/M ADIR disk directory utility displays all or selected files showing file name, file size, number of files on disk, amount of space used/remaining on disk. \$9.95 US SRS COMPUTER COMPANY, INC. 2082 CUTLER ST., SIMI VALLEY, CA. 93065.

6800/6809 Software including compatible single-user, multi-user and network operating systems, compilers, accounting and word-processing packages. Free catalog. Software Dynamics, 2111 W. Crescent, Su. G, Anaheim, CA 92801, (714) 635-4760.

STRUCTURAL ENGINEERING. Patterson Engineering has programs written for the Apple computer. Simple beam, Continuous beam, Grid, Frames, and Trusses represent some of our programs. 15052 Springdale Street, Huntington Beach, CA 92649. Interested persons call 714-898-1500.

INTERACT Owners. You are not abandoned. Write or call for catalogue on tapes, keyboards, RS232 interface,

40 INCOME TAX PROGRAMS For TRS-80 Mod. I/III On Formatted Disks

- Run on 16K or Larger DOS systems
- Documentation Included.
- Must be converted for Mod. III
- Various program Methods for study
- Check inputs; if OK, print, else easy to correct before printing
- Our Third Year of Tax Service
- Try ONE disk. If OK, 40 other Tax Programs are available.

FIRST DISK contains Form 1040, and Schedules A, B, C, D, SE and TC.

CAT. NO. TR #1

Price \$24.75 PPD



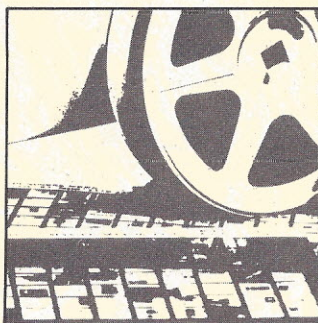
GOOTH SOFTWARE



931 S. Bemiston

St. Louis, Mo. 63105

CIRCLE INQUIRY NO. 110



University Microfilms International

Please send additional information

for _____

Name _____

Institution _____

Street _____

City _____

State _____ Zip _____

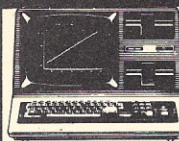
300 North Zeeb Road
Dept. P.R.
Ann Arbor, Mi. 48106

documentation, sales and service. Micro Video, POB 7357, Ann Arbor, MI 48107. (313) 996-0626.

QUALITY SOFTWARE. Database manager, advanced mailing list, inventory, word processor, GL, A/R, A/P and payroll systems. Available for TRS-80 Mod-I, II, III, IBM PC, CP/M and Heath. For catalog, send long SASE (37¢) to Micro Architect Inc., 96 Dothan St., Arlington, MA 02174.

MICRODEX is a classified advertising section available to readers wishing to buy, sell or trade hardware and software. Price is \$1 per word, with a 25 word minimum. The first two words bold. Additional bold type \$5 per word. Send copy with check or money order to INTERFACE AGE, Dept. M-I, 16704 Marquardt Ave., Cerritos, CA 90701.

**YOU CAN PAY MORE
BUT YOU CAN'T
GET MORE!**



Model III 16K

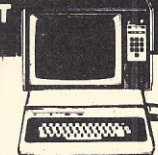
\$839

Model III 48K
2 disc & RS232C

\$2059

BUY DIRECT. These are just a few of our great offers which include Printers, Modems, Computers, Peripherals, Disc Drives, Software and more. **CALL TOLL FREE 1-800-343-8124**

We have the lowest possible fully warranted prices and a full complement of Radio Shack Software.



Color Computer 4K

\$310

w/16K Ext. Basic

\$459

w/32K Ext. Basic

\$525

computer plus

Write for your free catalog.

245A Great Road
Littleton, MA 01460
617 • 486 • 3193

CIRCLE INQUIRY NO. 107

Epson® MX 100 & MX70/MX80 Replacement Cartridge Ribbons



Introducing the Epson® MX100 Nylon replacement ribbon cartridge manufactured completely by Aspen Ribbons, Inc., offered in addition to our Epson® MX70/MX80 ribbon. Both of these products are 100% compatible with the original.

Prices are lower than those of the original equipment manufacturer. We encourage all retail, OEM, and wholesale inquiries. Remember, all of our ribbon products are recyclable.

Aspen Ribbons, Inc. • 1700 N. 55th Street
Boulder, Colorado USA 80301-2796
(303)444-4054 • Toll Free 1-800-525-0646
Telex 45-0055

CIRCLE INQUIRY NO. 106

DISKETTES CASSETTES

Error-Free 5¼-inch Diskettes (MD-5) single-sided, soft sector, single or double density, reinforced hub.

Item	Qty 10	Qty 50
MD-5	\$25.00	\$110.00
C-10	\$ 7.50	\$ 32.50
C-20	9.00	39.00
C-60	11.50	50.00
C-90	15.00	70.00

UPS SHIPPING INCLUDED
in Continental USA
CA Customers add taxes

MICROSETTE

475 Ellis St., Mt. View,
CA 94043 (415) 968-1604

CIRCLE INQUIRY NO. 113

MICRO MARKET

MICRO-MARKET ADS SELL YOUR PRODUCTS

A new format has been established for the Micro-Market section. All ads are now 2 inches wide by 3 inches deep. Price is \$320 on a 1x rate. Submit ads with check or money order to:

INTERFACE AGE Magazine
Micro-Market Ads
P.O. Box 1234
Cerritos, CA 90701
(213) 926-9544

PROTECT YOUR APPLE!



applecenter

- VOLTAGE SURGE PROTECTION
- COOLING FAN
- LOCKING ON/OFF SWITCH POWERS UP ENTIRE SYSTEM
- PROTECTIVE FRONT & BACK PANELS
- PROFESSIONAL APPEARANCE

FOR MORE INFORMATION: DOSS INDUSTRIES
1224 MARIPOSA ST. SAN FRANCISCO, CA 94107
(415) 861-2223
Apple is the registered trademark of Apple Computer.

CIRCLE INQUIRY NO. 109

FLOPPY DISK REPAIRS

★ **THREE DAY TURNAROUND** ★
AVERAGE

PERSCI ★ SHUGART ★ MICRPOLIS
QUME ★ PERTEC ★ TANDON
SEMENS ★ CDC ★ MPI
AND OTHERS
SINGLE AND DOUBLE SIDED
CUSTOMER INTERFACE
MODIFICATIONS

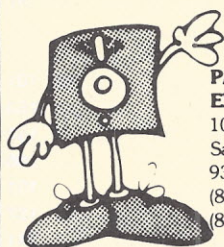
COMPUTER SERVICE CENTER

1023 NO. LA BREA
HOLLYWOOD, CALIF. 90038
213-851-2226

CIRCLE INQUIRY NO. 108

MEMOREX FLEXIBLE DISCS

WE WILL NOT BE UNDER-SOLD!! Call Free (800)235-4137 for prices and information. Dealer inquiries invited and C.O.D.'s accepted.



PACIFIC EXCHANGES
100 Foothill Blvd.
San Luis Obispo, CA
93401. In Cal. call
(800)592-5935 or
(805)543-1037

CIRCLE INQUIRY NO. 114



**TRS-80
DISCOUNT
DIRECT
PRICES**

Learn To **WRITE FOR**
"Do It Yourself" **FREE**
And Save Money **CATALOG**

1-800-841-0860 TOLL FREE

**YOUR TRS-80
PERSONAL COMPUTER
HEADQUARTERS
MICRO MANAGEMENT
SYSTEMS INC.
DEPT. NO. 6**

Downtown Plaza Shopping Center
115C Second Ave. S.W. • Cairo, Georgia 31728
912-377-7120 Ga. Phone No.

CIRCLE INQUIRY NO. 112

SMALL BUSINESS SOFTWARE

16 K COLOR MICROCOMPUTERS. INTERACT
MODEL R *****COPYRIGHT 1981
DAILY BANK DEPOSIT IN YOUR CURRENCY
MAX 10,000.00-SCREEN ONLY # 100S
\$49.95. DAILY BANK DEPOSIT INCLUDING
FOOD STAMPS. MAX 10,000.00. SCREEN
ONLY. #110S. \$59.95
FOR SHIPPING AND HANDLING ADD: U.S.
\$3.00-CANADA \$5.00-OTHER COUNTRIES
\$8.00-TEXAS ADD 5% SALES TAX. FOR
OTHERS 16 K COLOR MICROCOMPUTERS
AND OTHER PROGRAMS WRITE TO:

HOBBYTRONICS
BOX 3811, SAN ANGELO
TEXAS 76902-3811
U.S.A

CIRCLE INQUIRY NO. 111

VOICE SYNTHESIZER WITH INTERACTIVE TELEPHONE INTERFACE

For APPLE II compatible dial-up voice response and remote data-base access arrangements, consider a V100 series design from VYNET CORPORATION.

- Direct connect, auto-dial/answer
- Control via Touch-Tone™ detection
- Allophone (LPC) based voice synthesizer
- Includes 1,000 word vocabulary
- Editor for custom vocabulary
- Extensive application software
- Programmable buffered port
- Upgrade available for high quality LPC vocabulary
- \$395.00

Telephone interface may be purchased without synthesizer. TRS-80™ and IBM versions available soon.

VYNET CORPORATION
2405 QUME DRIVE
SAN JOSE, CA 95131
(408) 942-1037

CIRCLE INQUIRY NO. 116

Make your CP/M application friendly

STOK PILOT is a powerful language that allows developing a menu driven environment for any CP/M application, as well as developing an on line instructional utility for CP/M applications. This dual purpose of "System Control" and "CAI" provides for an unlimited range of uses. STOK PILOT makes CP/M transparent to the user by serving as a session control program that can chain from one program to the next in any other language! You can even execute CP/M commands from STOK PILOT! Comes with menu driven utilities and installation program. Disk and manual for \$109.00.

Software available in 8 in std CP/M format (inquire about others). N.Y. residents please add sales tax. Call for info and we'll deduct the phone call from your order!

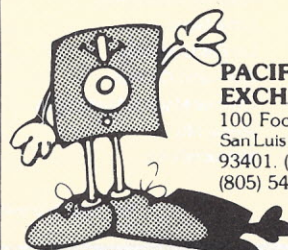
Stok Computer Interface
Dept. IA, P.O. Box 501
Woodside, NY 11377
(212) 426-7022

CP/M is a registered trademark of Digital Research, Inc.

CIRCLE INQUIRY NO. 115

Dysan CORPORATION

Solve your disc problems, buy 100% surface tested Dysan diskettes. All orders shipped from stock, within 24 hours. Call toll FREE (800) 235-4137 for prices and information. Visa and Master Card accepted.



PACIFIC EXCHANGES
100 Foothill Blvd.
San Luis Obispo, CA
93401. (In Cal. call
(805) 543-1037.)

CIRCLE INQUIRY NO. 114

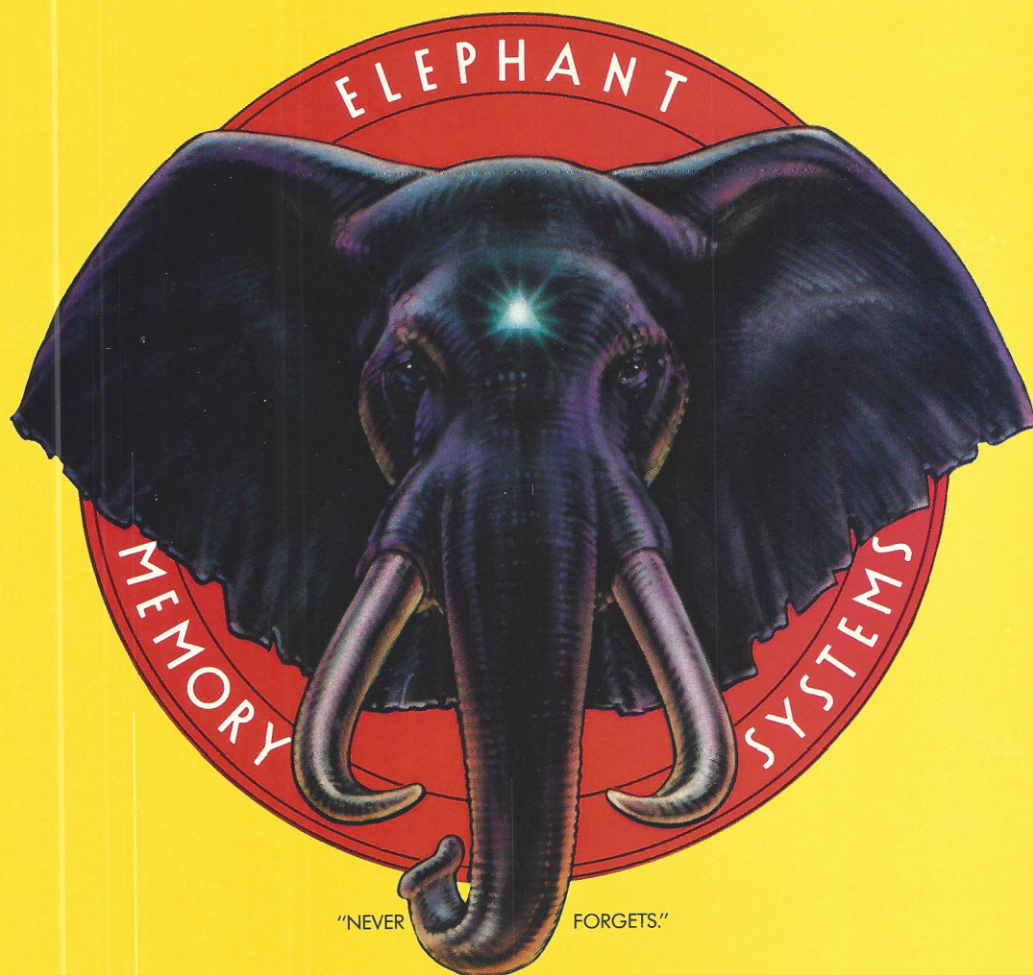
ADVERTISER INDEX

Info Inquiry Number	Page	Info Inquiry Number	Page
MANUFACTURERS			
1	AEI 7	60	Micropro International 81
2	Amdek BC	63	Muse 8
3, 4	Anvil Cases 98, 99	64	Net Profit Computer 134
5	Ashton Tate 107	65	New England Business Service 60
6	Aspen Software Co. 130	66	North America Mica 33
7	Association of Computer Users 61	68	PCE Systems 120
8	Atari 14, 15	69	Peachtree Software 145
9	Atsuko Computing International 64	*	Personal Computer Owners, Inc. 131
10	Avant Garde 117	71	Phase One 43
11, 12	Bausch & Lomb 13	118	Philadelphia Consulting Group, Inc. 146
13	John Bell Engineering 38	72	Pickles & Trout 26
14, 15	CMC International 37, 105	73	Pi-Tech 18
16	Cermetek 108	74, 78	Racet Computes 124
17	Columbia Data Products 41	75	Radio Shack 29
18	Commodore Computer 67	76	Rocky Mountain Software 72
19, 20	Compumax 28, 83	77	Sierra Data Services 25
21	Compuserve 4	*	Sinclair Research 16, 17
22	Computer Furniture & Accessories 12	79, 80	Standard Software 47, 63
23	Computer Services Corporation of America 9	81	Supersoft Associates 79
24	Computer Shopping Center 27	82	Systems Plus 73
25	Condor Computer 35	83	TCS Software 128
26	Cornucopia 23	84	Tarbell Electronics 28
27	Cromemco Inc. 1	85	Teletex IFC
*	Cybernetics 48	86	Transnet 49
*	Data Dynamics Technology 95, 103, 112, 113, 156	87	Univair 45
28	D & W Digital 82	*	University Microfilms 132, 158
29	Datacast 157	88	Versa Computing 44
30	Data Tech Reliance 50	89	Video Play Magazine 155
31	Digital Graphic Systems 30	90	Vista 31
32	Dillithium Press 51	91	Wildfire Publishing 39
33	Discount Software Group 66	92	Wiley Professional Software 47
34, 39	Dynabyte 83, 109		
35	Ecosoft 50	RETAIL	
36	Electronic Control Technology 46	93	American Square 100, 101
37	Electronic Specialists 53	94	Avid Electronics 153
38	Ellis Computing 75	95	The CPU Shop 147
*	Epson America 10, 11	96	Computer Discount of America 136
40	Freedom Technology 123	97	Computer Tutor 151
41	General Datacom 111	98	Cornerstone 137
42, 117, 44	Hayes Microcomputer 4, 20, 26	99	Eclectic Systems 141
45	Howard Software Services 6	101	Marymac 144
46	Independent Peripherals 46	102	Micro Business World 121
47	InfoSoft 5	103	Olympic Sales 143
48	Integrand 135	104	Pan American Electronics 64
49	Integrated Business Computers 3	105	Priority One 138, 139
*	Interface Age Back Issues 32		
*	Interface Age Subscriptions insert between 32 & 33	MICRO MARKET	
50	International Micro Systems 74	106	Aspen Ribbons, Inc. 158
51	JRT Systems 127	107	Computer Plus 158
52	Leading Edge IBC	108	Computer Service Center 159
53	Tom Lenz 49	109	Doss Industries 159
*	Library of Computer & Information Services 65, insert between 64 & 65	110	Goth Software 158
54	Lifeboat Associates 125	111	Hobbytronics 159
55	Little Genius 140	112	Micro Management Systems, Inc. 159
56	Lo-Ball Computer 133	113	Microsette Co. 158
57	3M Static Control 21	114	Pacific Exchanges 159
58	Charles Mann & Associates 38	115	Stok Computer Interface 159
*	Media Mix 129	116	Vynet 159
59	Microcraft Inc. 19		

* Manufacturer requests factory direct inquiry.

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

REMEMBER.



Elephant™ floppies.

They're guaranteed to meet or beat every industry standard for quality. They come standard with reinforced hub rings at no extra cost. They come in every popular 5¼" model, in both hard and

soft sector. And they sell at some of the lowest prices in the business.

Elephant Flexible Disks.

They're heavy duty. They work for peanuts.

They never forget. Get yourself a trunkful.

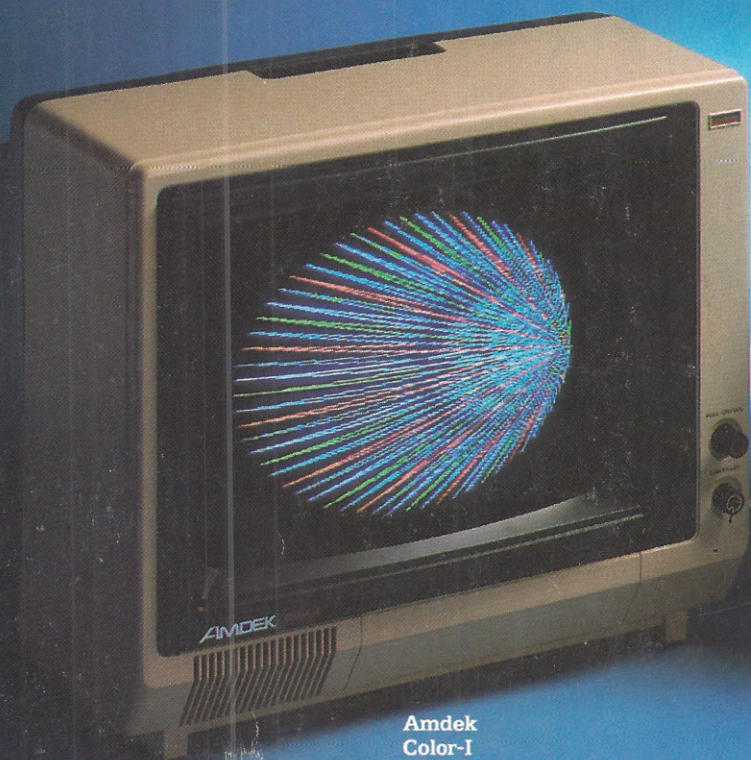
HEAVY DUTY DISKS.

Distributed Exclusively by Leading Edge Products, Inc., 225 Turnpike Street, Canton, Massachusetts 02021
Call: toll-free 1-800-343-6833; or in Massachusetts call collect (617) 828-8150. Telex 951-624.

Amdek

From picture perfect.

To letter perfect.



Amdek
Color-I
FCC/UL approved



Amdek
Video-300

At Amdek, we make monitors for people who demand state-of-the-art color. And for people who know that crisp, clear text display is an art in itself.

Our versatile Color-I 13" video monitor features standard NTSC composite input, front-mounted controls and a built-in speaker with audio circuit. Our popular Video-300 12" Green Phosphor monitor has an easy-to-read, non-glare screen, 18 MHZ band width and 80 x 24 character display.

Both offer easy portability, with lightweight cabinetry and molded-in handles. And both are fully

compatible with most computer and word processing systems. So compare our performance with other monitors. Then compare prices. For quality and value, you'll choose Amdek.

NEW THIS FALL: our advanced high resolution Color-II monitor with interface board for Apple II compatibility. Color-II features RGB, TTL input and 560(H) x 260(V) resolution for crisp 80 x 24 character display and exceptionally sharp color graphics. Ask your dealer about an Amdek Color-II, Color-I, or Video-300 monitor today.

AMDEK

2420 E. Oakton Street, Suite "E," Arlington Heights, Illinois 60005 (312) 364-1180 TLX: 25-4786